THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

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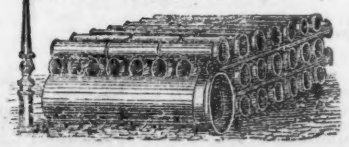

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PROPOSALS.

NAVY DEPARTMENT, WASHINGTON, Feb. 20, 1862.

IRON-CLAD STEAMERS.—The Navy Department will, until the 24th of March next, receive propositions for the complete construction and equipment of IRON-CLAD VESSELS for river harbor and coast defence.

These vessels, with the exception of those for the Mississippi River and its tributaries, will be propelled by screws; those for the Mississippi River and tributaries may be propelled by paddle-wheels The hulls will be either wholly of iron (which would be preferred) or of iron and wood combined, as the projectors may consider most suitable for the object proposed, but their sides and decks must be protected with an iron armature sufficient to resist the heaviest shot and shells.

The vessels for the Mississippi River and tributaries are not to draw more than six feet water when fully equipped and armed, at which draft they are to be able to maintain a permanent speed of nine knots per hour in still water, and carry sufficient coal in the bunkers for six days' steaming at that speed. Their armament will consist of not less than six eleven-inch guns.

The vessels for harbor defence are not to draw more than twelve feet water when fully equipped and armed, at which draft they are to be able to maintain a permanent speed of ten knots per hour in smooth water, and carry sufficient coal in the bunkers for seven days' steaming at that speed. Their armament will consist of not less than from two to four eleven-inch guns.

The vessels for coast defence are not to draw more than twenty feet water when fully equipped and armed, at which draft they are to be able to maintain a permanent speed of fifteen knots per hour at sea, and carry sufficient coal in the bunkers for twelve days' steaming at that speed. Their armament will consist of one or two fifteen or twenty-inch guns.

The guns of the vessels for harbor and coast defence are to train to all points of the compass without change in the vessel's position.

The propositions must state the number of vessels, subject to the election of the Department, which the party proposes to furnish complete in every respect, embracing armor plating, steam machinery and equipments of all kinds, ready for service, excepting only the ordnance and ordnance stores and provisions; the proposition must be accompanied by descriptions, specifications, drawings and models of such character that the work could be executed from them.

The place of delivery must be stated; the time within which the vessel or vessels are to be completed, and also the total sum to be paid for each.

It will be stipulated in the contract that one-fifth the total amount will be retained by the Government until sixty days after the reception of the vessel, in order to give it a trial, the remaining payments being made with due regard to the proper performance and progress of the work; the contract will also embrace forfeitures for failure to perform the conditions specified.

The bids must be accompanied by the guarantee required by law, that, if a contract is awarded, it will be promptly executed; and the names of the parties who are to become the sureties to the amount of the face of the contract will also be stated.

The Department will consider any other propositions that may be presented in which the draft of water above-named is not exceeded.

The Department will be at liberty to accept or reject any or all the propositions.

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The second part is approaching completion and will shortly be announced.

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WOODEN PURIFYING TRAYS.

WOODEN TRAYS FOR GAS-PURIFIERS.—The subscriber manufactures the WOODEN TRAYS for GAS-PURIFIERS on the invention of Wm. Combe, *cut from solid wood*, which are found superior to the iron plates formerly used, as being cheaper and more durable. The public are cautioned against the statements of R. G. Hunt, saying he has a patent for the seive itself, published in the AMERICAN GAS-LIGHT JOURNAL, as wholly without foundation. The following letter is from the Commissioner of Patents:

U. S. Patent Office, Jan. 6th, 1862.

SIR—In the matter of interference between the application of Hunt and Combe for patent conically slotted wooden gas-purifiers, appealed from the decision of the Examiner, the Examiners-in-Chief have rendered a decision, bearing date Jan. 4th, 1862. *The Examiners-in-Chief affirm the decision of the Examiner rejecting the first claim of Rich'd G. Hunt, and reverse the decision of the Examiner, rejecting the application of Wm. Combe, assigned to N. O. Hawxhurst.*

Unless an appeal shall be taken from this decision of the Examiners-in-Chief within the next ensuing thirty days, a patent will be allowed to N. O. Hawxhurst, assignee of Combe.

Respectfully, D. P. HOLLOWAY,
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Allen County.

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Ashland County.

Albion, *Ashland*, (c. h.,) Hayesville, Jeromesville, Lake Fork, Loudonville, McKay, Mifflin, Mohican, Nankin, Nova, Perote, Perryville, Polk, Rows, Ruggles, Savannah, Sullivan.

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Athens County.

Amesville, *Athens*, (c. h.,) Calvary, Canaanville, Chauncey, Coolville, Federalton, Garden, Guysville, Hartleyville, Hebbardsville, Hockingport, Hull's, Lee, Lottridge, Lowry, Marshfield, Medill, Millfield, Mineral, Nelsonville, New England, Pleasanton, Rock Oak, Shade, Torch, Trimble, Woodyard's.

Auglaize County.

Buckton, Cridersville, Deep Cut, Fryburgh, Kossuth, Minster, New Bremen, New Hampshire, New Knoxville, Rinchart, Saint John's, *Saint Mary's*, (c. h.,) Uniopolis, Wapakoneta, Waynesfield.

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Armstrong's Mills, Atlas, Bailey's Mills, Barnesville, Bell Air, Belmont, Bethesda, Bridgeport, Captina, Colerain, Demos, Dille's Bottom, East Richland, Flushing, Hendrysburgh, Hunter, Jacobsburgh, Kennon, Lamira, Lodysville, Martin's Ferry, Morristown, Pitcher, Plank Road, Powhatan Point, Pugh, Ring's Mills, *St. Clairsville*, (c. h.,) Sewellsville, Shepherdstown, Somerton, Temperanceville, Uniontown, Warnock, Wegee.

Brown County.

Aberdeen, Arnheim, Ash Ridge, Bloom Rose, Clover Valley, Decatur, De La Palma, Fayetteville, Feesburgh, Fincastle, Five Mile, *Georgetown*, (c. h.,) Hamersville, Higginsport, Lewis, Locust Ridge, Maple, Mount Orab, New Harmony, New Hope, Ripley, Russellville, Sardinia, Todd's Run, White Oak Valley.

Butler County.

Alert, Bethany, Blue Ball, Bunker Hill, College Corner, Collinsville, Contreras, Darrtown, *Hamilton*, (c. h.) Jacksonboro', Jones' Station, Le Sourdsville, Middletown, Millville, Monroe, Okeaka, Oxford, Paddy's Run, Philanthropy, Pisgah, Poast Town, Port Union, Princeton, Reiley, Ross, Saint Charles, Seven Mile, Somerville, Stillwell's, Symmes' Corner, Trenton, West Chester.

Carroll County.

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Champaign County.

Baker's, Brinton, Carysville, Chalfant, Christianburgh, Mechanicsburgh, Millerstown, Mutual, North Lewisburgh, Saint Paris, Spring Hills, Terre Haute, Tyffe, *Urbana*, (c. h.,) Westville, Woodstock.

Clark County.

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Clermont County.

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Clinton County.

Blanchester, Bloomington, Clarksville, Clinton Valley, Cuba, Lee's Creek, Lumberton, Martinsville, New Antioch, New Burlington, New Vienna, Oakland, Port William, Reedsville, Sabina, Sligo, Snow Hill, Westborough, *Wilmington*, (c. h.,) Wilson's Station.

Columbiana County.

Achor, Bayard, Buck's, Calcutta, Cannon's Mill, Clarkson, Columbiana, Damascoville, Dungannon, East Fairfield, East Liverpool, East Palestine, East Rochester, Elkton, Franklin Square, Gavers, Glasgow, Green Hill, Hanoverton, Ingraham, Inverness, Little Beaver Bridge, Moultrie, New Alexander, New Chambersburgh, New Garden, *New Lisbon*, (c. h.,) New Waterford, North Georgetown, Saint Clair, Salem, Salineville, Sandy, Summitville, Unity, Washingtonville, Wellsville, West Beaver, West Point.

Coshocton County.

Beacon, Bakersville, Boyd's Mills, Canal Lewisville, Chill, Clark's, Conesville, *Coshocton*, (c. h.,) Evansburgh, Keene, Linton Mills, Mohawk Valley, Munnsville, New Bedford, New Castle, New Guilford, New Moscow, New Princeton, Plainfield, Roscoe, Rural Vale, Spring Mountain, Tyverton, Tyrone, Wakatomita, Walhonding, Warsaw, West Bedford, West Carlisle, West La Fayette, White Eyes Plains, Will's Creek, Yankee Ridge.

Crawford County.

Broken Sword, *Bucyrus*, (c. h.,) Camp Run, Chatfield, Crestline, Galion, Liberty Corners, Leesville Cross Roads, Likens, New Washington, North Robinson, Oceola, Poplar, Sulphur Springs, Tiro, Wellerville.

Cuyahoga County.

Barry, Bedford, Berea, Bricksville, Brooklyn, Chagrin Falls, Cleveland, Coe Ridge, Collamer, Dover, East Cleveland, East Rockport, Euclid, Gate's Mills, Independence, Mayfield, Middleburgh, Newburgh, North Dover, North Royalton, North Solon, Olmstead, Parma, Rock Port, Solon, Strongsville, Warrensville, West View.

Darke County.

Ansonia, Arcanum, Beamsville, Brock, Castine, Concordia, Darke, Dawn, De Lisle, German, Gettysburg, Gordon, *Greenville*, (c. h.,) Hill Grove, Ithaca, Jacksonville, Matchett, Mississinawa, Mount Heron, New Harrison, New Madison, North Star, Painter Creek, Pittsburgh, Poplar Ridge, Republican, Seven Mile Prairie, Tampico, Webster, Woodland, Yankeetown.

Defiance County.

Arrowsmith's, Ayersville, Brunersburgh, *Defiance*, (c. h.,) Evansport, Farmer, Hicksville, Milldale, Milo, Ney, Panama, Snookville.

Delaware County.

Alum Creek, Ashley, Belle Point, Berkshire, Centre Village, Constantia, Condit, *Delaware*, (c. h.,) East Orange, Galena, Genoa Cross Roads, Harlem, Kilbourne, Kingston Centre, Leonardsburgh, Lewis Centre, Maxwell, Norton, Ostrander, Patterson, Porter, Powell, Radnor, Sunbury, Tanktown, Unison, Van's Valley, White Sulphur, Williamsville.

Erie County.

Berlin Heights, Berlin Station, Berlinville, Birmingham, Bloomingville, Castalia, Florence, Huron, Ione, Kelley's Island, Milan, Prairieville, *Sandusky*, (c. h.,) Venice, Vermillion.

Fairfield County.

Amanda, Baltimore, Basil, Bremen, Carroll, Cedar Hill, Clear Creek, Clear Port, Dumontville, Green Castle, *Lancaster*, (c. h.,) Lithopolis, Lockville, Marcy, Millersport, New Salem, North Berne, Pickerington, Pleasantville, Royalton, Rushville, Stoutsville, Sugar Grove, Walnut, West Rushville.

Fayette County.

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Franklin County.

Alton, Black Lick, Blendon, Canal Winchester, Central College, Clintonville, *Columbus*, (c. h.,) Darby, Dublin, Gahanna, Georgesville, Grove City, Grove Port, Harrisburgh, Hilliards, Hope, Lockbourne, North Columbus, Ovid, Park's Mills, Pleasant Corners, Reynoldsburgh, Shadeville, Westerville, Wheatland, Worthington.

Fulton County.

Al, Allston, Archbold, Blanc, Chesterfield, Delta, Elmira, Emery, Gorham, Handy, Lavona, Lena, Lyons, Metamora, Mill Creek, Ottokee, Pettisville, Tedrow, Wauseon, West Barre, Winameg.

Gallia County.

Addison, Anselm, Bay's Bottom, Cheshire, Ewington, Firor, Gallipolis, Harris, Kyger, Little Bullskin, McDaniel's, Mercerville, Northup, Patriot, Pine Grove, Racoon Island, Rio Grande, Rodney, South Newcastle, Swan Creek, Thivener, Thurman, Vinton, Wales, Walnut Ridge, Waterloo.

Geauga County

Auburn, Bissell's, Bridge Creek, Bundysburgh, Burton, *Chardon*, (c. h.,) Chester Cross Roads, Claridon, East Claridon, Ford, Hampden, Huntsburgh, Middlefield, Montville, Mulberry Corners, Newbury, North Newbury, Parkman, Pond, Russell, Thompson, Welshfield.

Greene County.

Alpha, Bellbrook, Bowersville, Byron, Cedarville, Clifton, Clio, Fairfield, Grape Grove, Jamestown, Kneisly, New Jasper, Osborn, Paintersville, Spring Valley, *Xenia*, (c. h.,) Yellow Springs, Zimmerman.

Guernsey County.

Antrim, Batesville, Bird's Run, Buffalo, *Cambridge*, (c. h.,) Claysville, Creighton, Cumberland, Dyson's, Fairview, Galigher, Gibson's Station, Gomber, Indian Camp, Kimbolton, Leatherwood, Londonderry, Middlebourne, Milnersville, North Salem, Salesville, Senecaville, Spencer's Station, Washington, Winchester.

Hamilton County.

Bevis' Tavern, Burnet Wood, Carthage, Cherry Grove, Cheviot, *Cincinnati*, (c. h.,) Cleves, College Hill, Columbia, Cove Dale, Cumminsville, Delhi, Dent, Dry Ridge, Dunlap, East Sycamore, Elizabethtown, Fulton, Glendale, Groesbeck, Harrison, Indian Hill, Lockland, Madisonville, Miami, Montgomery, Mount Airy, Mount Healthy, Mount Washington, Newtown, Plainville, Pleasant Ridge, Pleasant Run, Polktown, Preston, Reading, Sharonville, Sixteen Mile Stand, Spring Dale, South Pendleton, Storrs, Sweet Wine, Taylor's Creek, Tompkins, Transit, Walnut Hills.

Hancock County.

Alba, Arcadia, Arlington, Benton Ridge, Big Lick, Blanchard Bridge, Bloody Eagle, Cannonsburgh, Cass, Clement, Eagle, *Finley*, (c. h.,) Hassan, McComb, Mount Blanchard, North Ridge, Oak Ridge, Portage Centre, Van Buren, Vanlue, West Independence.

Hardin County.

Ada, Dudley, Dunkirk, Forest, Hale, Hudsonville, Huntersville, *Kenton*, (c. h.,) McDonald, Mount Victory, North Washington, Round Head, Sylvia.

VENTILATION AND ARTIFICIAL WARMING.—These are questions of vital importance in regard to dwellings, though, judging from the neglectful indifference of multitudes, their value is far from being duly appreciated by the educated, and even by some in the scientific classes of the community. Were it otherwise, the closeness perceptible on entering many of their dwellings, the oppressive heat of the rooms, the sickening fustiness in the apartments occupied by the servants, and too often in those of the children, would certainly not exist. When the number of hours passed within doors by every human being in a civilized state is considered, it will be manifest that the breathing of vitiated air for so long a portion of the twenty-four hours, must be as injurious as living on unwholesome food.—*Builder.*

PORTLAND, ME.—The Common Council of Portland, on February 3d, passed two orders concerning the gas-light company in that city—one, allowing and paying the bill of the company ($5,731 03) for lighting the streets for six months, ending July 1st, 1861—the other directing the Committee on Lamps to notify the company, that the rates charged for gas are not satisfactory to the city; and authorizing the committee to agree with the company for future rates, if they can, subject to the approval of the City Council.

PHILADELPHIA, PA.—During the past year, 7,566,070,538 gallons of water were pumped out of the Schuylkill river by the Fairmount Water-Works, showing the daily consumption of water to be 27,700,000 gallons. In round numbers the population of Philadelphia is 550,000. The amount of water daily used by each inhabitant of the city averages 50 gallons.

FIRE AND EXPLOSION AT AN OIL WELL.—*A "Juglar" Tapped.*—We have received from a correspondent, says the Pittsburg *Chronicle*, of the 7th, the following interesting letter, dated yesterdy, at Glasgow, Penn., near Smith's Ferry:

"A vein of oil and gas was struck at the depth of four hundred and eighty feet, at one o'clock P. M.—The shanty was almost immediately charged with gas, from the fact that in the course of ten to fifteen minutes after making the strike, the shanty and derrick were in a blaze. The gas was ignited from the furnace, owing to the dampness of the day.

"An attempt was made to smother the fire by throwing on clay and rubbish, but all efforts were fruitless, and seemed to increased the flame. The oil and water coursed down the street burning as it ran. This caused great alarm, thinking it would soon spread so as to communicate the blaze to the palings, and from thence to the dwellings. To avert this danger, all hands were set to work with shovels, and mattocks, cutting a ditch and turning the stream in another direction, causing it to empty into the river. The gas and oil continued to flow in great abundance almost incessantly for three hours, and then abated long enough to have the fire smothered, by all hands working vigorously, employing every man available.

"It would be impossible to determine what amount of oil was thrown from the well during this period; it it variously estimated at from fifty to one hundred barrels.

"The well still continues throwing a strong stream of almost pure oil, variously estimated at from 50 to 100 barrels."

SEWAGE AND WATER-SUPPLY.—The sewage matter of one town is thrown into the river, and some few miles further down the inhabitants of a second town will take their water-supply from it; and just below this, again, discharge their own sewage matter into it. Thus the sewage of Newcastle is discharged into the Tyne, and carried down to North and South Shields; the exulcerations of Sheffield go down to Doncaster, and thence past Kingston-upon-Hull; and, as we write, Shrewsbury, acting upon our advice to purify itself, is deliberating upon plans which erroneously pour the sewage into the beautiful Severn, whose waters, sweeping past Bridgnorth, lave the city of Worcester; and so disease is constantly breeding in our rivers all over the country. We breathe and drink putridity, but not with impunity. The practice costs us 15,000 deaths a year by typhoid fever, 27,000 deaths annually by cholera, dysentery, and diarrhœa, and forces us to look on and see 60,000 little children annually pine, languish, and die of infantile diarrhœa. So our sloth, and disregard, and niggardness are by no means cheap; indeed, it would take a nice calculation to prove that such high death-rates are less costly than supplies of pure water and proper disposal of the drainage.—*London Builder.*

GREENBUSH, N. Y.—Gas-works are to be built here immediately. Who is the moving spirit? Let us know all about it.

WATER WORKS OF AMERICA.

PHILADELPHIA, PA.

The annual report of Chief Engineer Birkinbine, for the year 1861, to the Councils of Philadelphia, is a document of unusual interest, and will repay a careful perusal. Its great length precludes its publication entire in our columns, but we make room for an abstract of its principal points of interest.

The condition of the Fairmount Dam, the drainage into it, the encroachments upon its area, are first alluded to as matters of paramount importance. A careful survey of the river has been made from the dam at Fairmount to the Columbia bridge, which is the part of the river of most vital importance to the city. From this point upward to Flat Rock Dam it has been carefully examined, though not surveyed. A very rapid accumulation of detritus in the dam has taken place, which will be evident upon comparing the surveys just made by the Department with a hydrographic survey made by the Schuylkill Navigation Company, of the western part of the river, from a point below the Twenty-fourth Ward Works to the Girard Avenue bridge. The mud has accumulated in this portion of the river to such an extent as to impede navigation, and force all loaded boats to take the middle of the stream. This survey was made in 1853, and the comparison of the two shows the deposit of mud at this point to be 58,379 cubic yards, or an average yearly deposit of 7,297 cubic yards. In other parts of the dam the accumulation is evidently much more rapid, but for want of actual surveys with which to compare those recently made by the Department, it cannot be accurately ascertained. The entire amount would no doubt be found to be from 25,000 to 30,000 cubic yards per year in the lower reaches of the dam, viz: from Columbia bridge down. The deposits produced by the Skaters' Club House, which projects into the river, causing a retrograde motion of the water, furnish an instance. The accumulations at this point extend along the south of the Park to the steamboat wharf at Fairmount, where the water has become so shallow that the mud is disturbed every time the boats approach or leave the wharf. This mud thus agitated passes immediately into the fore-bay and is, in part, pumped into the reservoirs. The effect of this structure and the promontroy formed to accommodate it upon the current, has been found to be much more disastrous than was at first feared, and its removal to some other site is absolutely demanded, and not for the above reason only. It so confines and directs the scour of the river that its bed is already washed to a depth of 31 feet within a short distance of the dam, endangering the permanence of the structure. The removal of the house and of the earth thrown in at this place would allow the current to flow along the south front of the Park and carry away the present accumulated mud, and restore the river nearly to its original condition. Either this must be done, or the river must be filled in to a considerable distance from the present shore line; otherwise, the stagnant condition of the water and want of depth will lead to putrefaction. The remedy of filling in the river and thus contracting the shores and diminishing the volume of the stream—as would be the case in this instance—is not a desirable alternative. It would be a permanent injury, as there would then be less opportunity for the subsidence of matter held in suspension, and the water ever after would be less pure. The water from this point is in part mixed with that supplied to the reservoir, and materially affects the salubrity of the city supply.

The surveys of the river have shown that the detritus which is brought down by freshets and deposited in the dam, is rapidly filling it up. In a few years there will be an extensive formation of solid land near the western bank of the river, commencing below the Girard Avenue bridge and extending south below the Twenty-fourth Ward Works, filling up nearly one-half the river. A similar deposit is forming above the bridge, also near the western side. In order to prevent these accumulations and to increase the depth of the river, it is recommended that dredging be resorted to. Perhaps the best means of getting rid of the difficulty would be to form islands of these deposits; this could be done at a small expense, and as the river would then probably keep its own channel clear, future accumulations would be prevented. During the warmer months there is a marked difference in character between the water flowing over this mud and that in the channel of the river.

The mean sectional area of the river between Fairmount and Columbia bridge is found to be 8,254 square feet. This cross section is maintained with considerable regularity. The smallest sectional area is immediately below Girard Avenue bridge, where it is 6,700 feet, and the greatest sectional area is at Turtle Rock, the southwest point of the Park, where it is 10,519 feet. The mean depth of the water in the dam is 11.3 feet, the deepest part is 35 feet. The mean velocity of the water between the dam and Columbia bridge, a distance of 9,415 feet, in ordinary stages of the river is about two miles a day, giving a mean discharge of water of 650,000,000 gallons per day.

The amount of sewage which flows into the dam above the Fairmount Works, is becoming of a more objectionable character yearly, and remedies for this evil are much needed. The breweries and factories situated on the banks of the river and the creeks leading into it, empty into the dam a large amount of refuse matter. In some rough experiments made to ascertain the hardness of the water, above Manayunk, and at Fairmount, that at Fairmount appeared to be harder, than that above Manayunk. If this be so, it can only be accounted for by the large amount of impurites discharged into the river by the factories, reaching many thousand tons in a year. Much of this discharge could be prevented without serious inconvenience or expense to the manufactories. The Gas Works still continue to discharge their wash-water and refuse tar directly into the river. The character of this discharge and the repulsive appearance of the scum floating upon the surface, are such as to call imperatively for interposition.

OTHER SOURCES OF WATER SUPPLY.

However carefully Fairmount Dam is guarded, the quality of the water will of necessity be constantly deteriorating, as population and manufactories increase in the district of country drained by the Schuylkill and its tributaries, and as the section becomes more highly cultivated. The London water companies were, a few years ago, forced by acts of Parliament to remove their works from that part of the Thames affected by the sewage of the city, to a point higher up the river and above the city. They were also required to construct extensive subsiding reservoirs, and filter beds. A much greater sum of money was expended upon these alterations and improvements, than would represent the entire value of the works of Philadelphia, at the present time. Surveys are now being made by one of the most eminent hydraulic engineers of that country, for bringing in a supply of water, to be collected in the mountains of Wales. Water collected in the same manner, viz., from hills, is now supplied to the cities of Manchester and Liverpool, the superior quality of which, as well as the abundant and constant supply, has induced London to look to so distant and expensive a source. Water collected from the surface of hills not cultivated, and distant from cities and large towns, will be almost absolutely free from mineral and organic impurities. Indeed there is no other source from which water of such positive purity can be procured, not even from springs, for these are rarely free from mineral matter. Such sources of supply exist within moderate distance of Philadelphia, where abundant gathering grounds, of sufficient area and eligible sites for store reservoirs can be procured, and the water delivered to the city at such elevation as to make pumping unnecessary.

CONDITION AND OPERATION OF THE WORKS.

FAIRMOUNT DAM.

The structure of the dam is rapidly decaying, and will very soon require rebuilding. Its vital importance to the water supply of the city is such, that no possible risk of its failure should be incurred. It is recommended that it be rebuilt of stone. This, although much more expensive, would make it a permanent structure. Wood-work will last but from fifteen to twenty years, under the circumstances.

CAPACITY OF RESERVOIRS.

The storage capacity of the reservoirs when full is as follows:

Fairmount	5 Reservoirs,	....	26,000,000
Corinthian Avenne	1	"	37,300,000
Spring Garden	2	"	9,800,000
Kensington	2	"	9,384,000
Total storage capacity,		.....	83,300,000 galls.

This is about four days average supply to the city, and but a little over two days, when the greatest demands are made upon the Works.

WORKS.

FAIRMOUNT WORKS.

These Works have furnished a larger amount of water in 1861 than any previous year. Much of the machinery is old and dilapidated, and requires a large amount of repairs. Indeed the entire works should be rebuilt. The large amount of wood-work entering into the construction of the old works is constantly decaying, and requires extensive repairs every year. The amount of water pumped this year exceeds that of last year 224,796,611 gallons. A part of this excess was supplied to the district furnished from the Schuylkill Works. The annexed table exhibits the operation of the works for the past year.

OPERATION OF THE FAIRMOUNT WATER WORKS DURIN 1861.

MONTHS.	Water. Gallons of Water pumped each month.	Water. Average number of gallons pumped per day.	Oil. Quarts of Oil used during the month.	Oil. Gallons raised into Reservoir per quart of oil.	Oil. Duty in million gallons raised one foot high per quart of oil.	Tallow. Pounds of Tallow used during the month.	Tallow. Gallons raised into Reservoir per pound of tallow.	Tallow. Duty in million gallons raised one foot high per pound of tallow.
January	287,600,275	7,664,525	76	3,126,319	312	8	29,700,034	2,970
February	234,394,875	8,371,245	52	4,507,593	450	5	46,878,975	4,687
March	255,390,245	8,238,395	35	7,296,864	729	7	36,484,320	3,648
April	272,939,810	9,097,993	32	8,529,369	835	6	48,234,952	4,823
May	343,538,745	11,081,891	32	10,735,585	1,073	7	49,076,963	4,907
June	329,274,515	10,975,832	34	9,684,544	968	16	20,579,657	2,057
July	317,836,525	12,188,275	37	10,211,798	1,021	26	14,532,174	1,453
August	389,153,560	12,552,760	36	10,809,321	1,080	9	43,287,284	4,328
September	363,812,900	12,127,070	41	8,878,485	887	6	60,635,493	6,063
October	392,340,960	12,656,160	48	8,173,170	817	10	39,284,096	3,928
November	293,220,171	9,774,005	27	10,860,060	1,086	6	48,870,029	4,887
December	242,233,047	7,815,579	30	8,076,101	807	4	60,570,761	6,057
Total	3,731,785,628	10,224,070	480	7,774,553	777	110	33,925,324	3,392

SCHUYLKILL WORKS.

The operation of these works has been extremely satisfactory through the year; a slight saving in fuel has been effected above the last year. The amount of water pumped has not been as large; the assistance rendered by Fairmount Works through the Corinthian avenue reservoir making it unnecessary. The deficiency was 169,777,511 gallons. While the saving in coal has been considerable, the expense of pumping has been slightly increased. The following table exhibits the operation of the works for the past year:

OPERATION OF THE SCHUYLKILL WORKS DURING THE YEAR 1861.

MONTHS.	Water. Gallons of water pumped each month.	Water. Average number of gallons pumped per day.	Coal. Pounds of coal consumed during the month.	Coal. Gallons raised into reservoir per pound of coal.	Coal. Duty in gallons, raised one foot high per pound of coal.	Oil. Quarts of oil used each month.	Oil. Gallons raised into reservoir per quart of oil.	Oil. Duty in million gallons raised one foot high per quart of oil.	Tallow. Pounds of tallow used during the month.	Tallow. Gallons raised into reservoir per pound of tallow.	Tallow. Duty in million gallons raised one foot high per pound of tallow.
January	156,684,300	5,054,332	367,136	246.7	49,170	37¾	4,178,248	480	98	1,598,819	183
February	170,295,670	6,081,988	472,530	360 2	41,423	38¾	4 423,264	508	100	1,702,956	196
March	205,620,510	6,632,919	596,960	344.4	39,606	69¼	2 958,568	240	120	1,713,504	197
April	202,456,700	6,748,556	629,216	321.4	37,095	49	4,131,769	475	134	1,510,870	173
May	219,812,040	7,090,711	626,864	350.6	40,319	54	4,075,593	468	124	1,772,677	203
June	222,805,240	7,426,841	669,536	332	38,180	62	3,594,600	413	115	1,937,436	222
July	254,015,350	8,194,043	665,280	381.8	43,907	63	4,031,989	463	136	1,867,769	214
August	252,387,510	8,141,532	756.896	333.4	38,341	63	4,006,151	460	159	1,587,342	192
September	239,461,280	7,982,042	717 696	323.6	38,346	62	3 863,892	343	136	1,760,744	202
October	191,714,820	6,184,360	646,464	296.5	34,097	47	4,079,038	469	126	1,521,546	174
November	229,671,390	7,655,713	628,768	365.3	41,998	54	4,253,174	489	124	1,045,737	120
December	182,257,900	5,879,287	595,840	306	35,190	33	5,222,960	604	108	1,691,276	194
Total	2,527,182,710	6,923,788	7,373,186	343	29,445	632¾	3,995,545	459	1,480	1,707,555	196

Average duty for the year, 32,870,800 pounds, raised one foot high, by the consumption of 100 lbs. of anthracite coal.
Average duty for 1860, 32,115,800 " " " " " " " " " "
Average duty for 1859, 25,570,300 " " " " " " " " " "

OPERATION OF THE DELAWARE WORKS DURING THE YEAR 1861.

MONTHS.	Water. Gallons of water pumped each month.	Water. Average number of gallons pumped per day.	Coal. Pounds of coal consumed during the month.	Coal. Gallons raised into reservoir per pound of pound.	Coal. Duty in gallons raised one foot high per pound of coal.	Oil. Quarts of oil used during the month.	Oil. Gallons raised into reservoir per quart of oil.	Oil. Duty in million gallons raised one foot high per quart of oil.	Tallow. Pounds of tallow used during the month.	Tallow. Gallons raised into reservoir per pound of tallow.	Tallow. Duty in million gallons raised one foot high per pound of tallow.
January	60,267,380	1,944,109	284,185	212.1	28,744	19	3 171,967	355	30	2,008,912	224
February	56.395,800	2.014,136	260,965	200 8	22,489	14	4,028,271	460	22	2,563,445	294
March	63,605,150	2,051,776	288,320	220 6	24,707	22½	2,826,891	317	42	1,514,406	170
April	69.559 230	2,318,641	310,200	224.2	25,110	24½	2,839,152	317	44	1.580,891	177
May	84,910,320	2,739.042	368,085	230.6	25,827	32	2,656,885	297	54	1.572,413	176
June	88.616,160	2,963,872	323,228	275	30,700	25	3,556.644	398	52	1.709,939	191
July	110,985,480	3.580,176	375,140	295.8	33.129	27½	4,035,832	431	50	2.219,709	248
August	103,259,310	3.330.945	411,340	251.	28,112	28½	3,623.434	405	44	2.346,802	262
September	102.217,200	3,407,240	392,345	260.5	29,176	27½	4,008.520	488	23	4,444,208	497
October	92.088,810	2.972,445	369,080	249.4	27,732	23	4,003,644	448	43	2,048,600	229
November	81.697 520	2,723,250	376,329	217.	24,304	24	3,404,063	381	42	1.945,179	217
December	69,918,440	2,255,433	342,380	204.2	22,970	17½	3,995,333	446	34	2,056,424	230
Total	983,805,740	2,695,358	4,101,597	242	26,904	283	3,476,345	388	480	2,049,595	229

Average duty for the year, 22,420,000 pounds raised one foot high, by the consumption of 100 lbs. of anthracite coal.
Average for 1860, 20,525 800 " " " " " " " " " "
" " 1859, 19.720 800 " " " " " " " " " "

OPERATION OF THE TWENTY-FOURTH WARD WORKS DURING 1861.

MONTHS.	Water. Gallons of water pumped each month.	Water. Average number of gallons pumped per day.	Coal. Pounds of coal consumed during the month.	Coal. Gallons raised into Reservoir per pound of coal.	Coal. Duty in gallons raised one foot high per pound of coal.	Oil. Quarts of oil used during the month.	Oil. Gallons raised into Reservoir per quart of oil.	Oil. Duty in million gallons raised one foot high per quart of oil.	Tallow. Pounds of tallow used during the month.	Tallow. Gallons raised into Reservoir per pound of tallow.	Tallow. Duty in million gallons raised one foot high per pound of tallow.
January	23,127,300	746,042	112,450	205.6	47.288	5	4,625,460	1,063	14	1.651.950	379
February	22,378,500	799.232	111,925	199.8	45,954	3¼	6,898,857	1,469	10	2.237.850	512
March	23,451,480	756,467	119,200	196.7	45.241	5	4.690,296	1,079	16	1.465,717	337
April	25,235.820	841,194	121,544	207.6	47,748	3¼	7.210,231	1.658	17	1,484,460	341
May	27,828,360	897,689	142.350	195.4	44,942	3	9,276,120	2,133	20	1,391,418	319
June	31.869,030	1,061,301	145,114	219.	50,370	4	7.959,783	1.830	16	1.989,946	457
July	36,738,180	1,185,102	177.864	206.5	47,495	4	9,184,545	2,112	16	2.296.186	528
August	38,066,130	1,227 939	179,700	217.4	50.002	4¼	8,459,140	1,945	15	2,537,742	583
September	34,629,750	1,154,325	169,500	204.3	46,989	4	8,657.437	1,989	14	2,473,553	568
October	35,549,460	1,146,756	180,000	197.5	45,425	4	8,887,365	2,044	12	2,962.455	681
November	24,621,759	820,725	126,000	195.4	44,942	4	6 155,437	1,415	14	1.758,696	404
December	29,848,140	962,844	168 200	177.	40,710	4	7 462,035	1,716	12	2,488,345	572
Total	53 313,900	967,956	1,753,847	201	46,230	48	7.360 706	1.692	176	2.007,465	660

Average duty for the year, 38,545,000 pounds raised one foot high, by the consumption of 100 lbs. of anthracite coal.
Do. 1860, 38,500,800 " " " " " " " " " "
Do. 1859, 28,520.800 " " " " " " " " " "

TOTAL QUANTITY OF WATER PUMPED BY ALL THE WORKS DURING THE YEAR 1861.

MONTHS.	Gallons pumped each month.	Average number of gallons pumped per day.
January	447,679,255	15,409,008
February	488,464,845	17,266,601
March	548,067,285	17,679,580
April	570,191,560	19,006,385
May	676,089,465	21,809,337
June	672,884,945	22,427,887
July	799,575,535	25,147,596
August	782,848,510	25,253,176
September	740,121,130	24,670,697
October	721,689,050	22,959,710
November	629,210,831	20,973,698
December	524,307,527	16,913,146
Total	7,596,079,938	20,728 985

Of the above, the following amounts were pumped by each of the works:

	Total.	Daily average.
Fairmount	3,731,785,628	10,224,070
Schuylkill	2,527,182,710	6,923,788
Delaware	983,805,740	2,695,358
Twenty-fourth Ward	353,313,900	967,956

COMPARATIVE ECONOMY OF THE WORKS IN COAL, OIL, AND TALLOW, FOR THE YEAR 1861.

WORKS.	Average number of gallons raised one foot high per pound of anthracite coal.	Pounds of anthracite coal per horse power per hour.	Number of pounds of water raised one foot high, per one hundred pounds of anthracite coal.	Millions of gallons raised one foot high, per quart of oil.	Millions of gallons raised one foot high per pound of tallow.
Fairmount	39,445	6.	32,870,800	480	3,392
Schuylkill	26,904	8.8	22,420,000	459	196
Delaware	46,230	5.1	38,545,000	388	229
24th Ward	37,526	6.6	31,278,600	1,692	660
Average				754	1,119
Average of 1860.	36,457	6.9	30,380,820	731	1,784
Average of 1859.	29,527	8.1	24,606,366	500	771

NEW MILL HOUSE.

The following description of the extension of the works may not be inappropriate, as they are so nearly finished:

Upon an examination of the water power of Fairmount Dam, it was ascertained that, except for a few days, (not over ten in each year,) a large amount of surplus power flowed over the dam, and for ten months more power was wasted than could be passed upon the nine wheels then operation at Fairmount. As the city required an additional supply, and as a large amount of the water then supplied was pumped by steam-power, which could be replaced by the surplus water-power passing over the dam, it was determined to increase the power of these works to something near the mean capacity of the river. To utilize this surplus power, the first plan that suggested itself was that of removing the old breast wheels, and substituting wheels better adapted to the peculiarities of the location, of better construction, and of much larger capacity. The first difficulty encountered in this suggestion, was the fact that the entire capacity of all the wheels was required to keep up a supply to the city—none of them could be spared. Secondly: the difficulty and danger in blasting the rock upon which the building stands, to procure sufficient depth to utilize the entire head and fall at low tide. Again: the head-arches, where the water from the dam enters the fore-bay, were found to be of too limited area to allow of the free passage of a sufficient amount of water to furnish the proposed increase of power. These arches could not be enlarged without stopping the entire works at Fairmount for some length of time. These considerations were decisive against the practicability of this plan. The mere possibility of interfering with the supply from this point, upon which so large a part of the city depends, was alone sufficient to discourage any attempt at remodeling these old works at that time. The next plan suggested, was the placing of wheels in the old engine-house, now the public saloon. The objections to this plan were the restricted area of the head-arches above referred to, and the difficulty in constructing a flume of sufficient area from the fore-bay to the wheel pits; the flume, wheel pits, and tail race would have to be excavated through the solid rock under the building. Examinations were then made at the site now occupied by the new wheel-house. The objections to this location, were: the possibility of accident to the dam in making the required excavations in and through it; the neces-

sity of guarding against the freshets so common to the Schuylkill, and the difficulty of procuring satisfactory foundations. It being, however, the only site where works of sufficient magnitude could be constructed, and where a sufficient volume of water could be drawn from the dam, it was believed that with proper care all possibility of accident could be guarded against and reliable foundations made. After a careful survey and examination of this point, work has commenced on the north or up-river side, by constructing a coffer-dam. Great pains were taken to make this firm and reliable against any possible rise in the river. This work was frequently severely tested by freshets. Inside, the coffer-dam was excavated to a proper depth, a bed of broken stone was prepared, upon which twelve-inch white pine logs were laid; sheet piling was then driven around this platform, the interstices between the logs were filled with broken stone, and cement-grout was run in, thus binding the whole mass together. This was then covered with three-inch pine plank, and upon this foundation the front wall, head-arches, and gates were erected. The gates and flumes are of cast iron, faced with brass, and are raised by simple screws. They open an area of water-way of sixty-five feet for each wheel. The front wall was carried up to its full height, the gates put in place, and the flume carried a sufficient distance into the embankment to secure perfect safety against the pressure of water in the dam, before any work was done upon its south or lower side. Some idea may be formed of the care necessary in prosecuting this entire work, when it is remembered that the dam backs the water up about seven miles, and its destruction would not only be disastrous to the valuable property along the river below it, but the entire city would be deprived of its water supply, except that part supplied by the Delaware Works. While the north front was in course of construction, the Schuylkill Navigation Company endeavored to stop the works, claiming to have certain rights to the structure of the dam, and that the navigation of the river would be endangered by the work. An injunction was procured, restraining the city from prosecuting the work in any other way except as it was then being done, and according to the plans exhibited to the Court by this department. A coffer-dam was next constructed on the south or lower side of the dam. This was found a matter of difficulty, on account of the great depth required for wheel-pits, and the trouble in procuring a good connection with the dam, which was found to be composed principally of loose stone. After excavating into the dam as far as safety would allow, and piling, a large quantity of water still leaked into coffer-dam when the tide was up. The south side of the dam had been excavated to a depth of fourteen feet below mean high tide, when a deep stratum of river mud was reached, into which three hundred and fifty piles were driven, passing through the mud and a stratum of from three to five feet of gravel—sixteen to twenty-three feet in all. The mud was then excavated to the depth of eighteen inches around the heads of the piles, and the space filled in with broken stone. Upon the heads of the piles twelve-inch timbers were laid, and around the exposed sides of the platform thus formed, a double row of jointed sheet-piling was driven. The interstices between the timbers of the platform were also filled in with broken stone, into which grout was run.

This platform, 113 feet by 23 feet, was then covered with a double thickness of three-inch planking, upon which the masonry for the building and pumps, and part of the foundations for the machinery, were placed. The wheels are placed immediately upon this floor. The foundations for the pumps are partly upon the structure of the dam. The loose stones composing the structure, were leveled to a proper depth for the foundation, and the interstices of the stones filled with a cement grout, in which 33,500 cubic feet of grout were used. By this means the entire floor was cemented into one compact mass, forming a satisfactory foundation for the masonry.

Plates 1 and 2 represent sections of the buildings, and sections and elevations of the wheels, pumps, &c. The roof of the mill-house is supported upon wrought iron girders, and is formed by brick arches laid with cement mortar, and covered with flagging.

WHEELS.

The wheels are placed near the south front of the wheel-house. This was necessary on account of the danger there would have been in excavating further into the dam. The water is conducted from the head-arches to each wheel by an eliptical wrought-iron flume, having a sectional area of seventy feet. It is then delivered into a cast-iron case, or reservoir, immediately over the wheel; from this it passes thrugh the guide curves, which direct the water upon the movable wheel under them, giving motion to the wheel. The water, after having acted upon the wheel, passes down through the draft tube, and out at the gate, which is a hollow cylinder, forming a continuation of the draft tube, resting upon the bottom of the wheel-pit and opening from below. These wheels have no essential feature not common to well constructed Jonval turbines.* They have been proportioned and constructed with care, with direct reference to the work they are to perform, and the peculiarities of the water-power under which they are to act. The guide-wheels are fitted into a conical cylinder, and the number of curves in each wheel is seventeen. The movable wheel is nine feet in diameter, and has fifty buckets.

GEARING.

The gearing by which the power is transmitted from the turbine wheel to the pumps, is composed, first of a pair of bevel wheels, carrying the power from the vertical shaft of the turbine to a horizontal counter shaft, then through a pair of spur wheels to the crank-shaft of the pumps, to which crank wheels are attached at either end, giving motion to the pumps. The pinions of both pairs of wheels are of iron, with the cogs accurately dressed, working into mortice wheels with hickory cogs.

PUMPS.

Two pumps are worked by each wheel, making six in all. They are placed in pairs horizontally, one on each side. They are eighteen inches in diameter, with six feet stroke of piston. The valves are double beat, working vertically in chambers placed at both ends of the pumps. One air vessel is placed immediately over each set of valves, one on the connecting main, between the chambers, and one on the suction pipe, which takes the water from the flumes supplying the wheels. The packing of the pump pistons is end wood, which is kept tight by means of a cone forced under the wooden ring. The mean capacity of all six pumps will be 16,000,000 gallons per day, although they can be worked up to 18,000,000 gallons, if necessary.

THE MAINS CONNECTING THE NEW AND OLD WORKS.

From the mill-house to near the foot of the upright pipe, there are thirty-three inch mains; at that point they branch into one forty-eight inch main, this connects with the upright pipe at its base. Provision is also made to continue the forty-eight inch main in the opposite direction to the reservoir at Corinthian avenue, at any time when the demand for water shall make it necessary. The upright pipe is of wrought iron, sixty inches in diameter and sixty four feet high; the top is closed, and a branch leads off from the upright tube seven feet below the top; the space between this branch and the top forms an air chamber, so that if there should be any irregularity at this point in the flow of the water, it would have a tendency to equalize it. This branch is but thirty-six inches in diameter, which is the size of the connections between the upright pipe and the old stand pipe. In the connecting pipe the flow of the water will be slightly retarded when all the pumps are working at their maximum speed. No larger pipe could be connected with the old stand pipe. When the whole power of the works is required, it will be necessary to lay the forty-eight inch main, provided for at the foot of the upright pipe, directly to the reservoir on Corinthian avenue. From the old stand pipe, the water supplied by the pumps in the new mill-house can be discharged either into the reservoirs at Fairmount through the connections now made, or into the Corinthian avenue reservoir through the thirty-inch main now connecting it with the old stand pipe. Through this thirty-inch main, eight millions of gallons may be forced into the Corinthian avenue reservoir per day. This main will therefore be found of sufficient capacity for two or three years to come; thus saving the expense of laying the large main for that length of time. The upright pipe is enclosed with stone-work, forming an ornamental tower, connected with the rocky side of the hill by an arch which carries and encloses the thirty-six inch main. On the top of this arch a walk is constructed, leading to the top of the tower.

* A full description of these wheels will be found in the AMERICAN GAS-LIGHT JOURNAL, vol. 2, p. 377.

RECEIPTS, EXPENDITURES, AND NET INCOME OF THE DEPARTMENT SINCE CONSOLIDATION.

Years.	Receipts.	Expenditures	Net income.	
1855,	$82,086 72	759,805 37	131,141 35	
1856,	351,936 49	138,954 85	212,981 64	
1857,	425,426 11	200,605 82	224,820 39	—$568,943 28
1858,	457,518 48	187,078 09	269,540 39	
1859,	551,180 08	225,082 03	326,098 05	
1860,	558,531 53	198,269 18	360,262 35	
1861,	533,980 06	162,724 94	371,255 12	—1,327,155 91
Total,	$3,260,609 47	$1,364,510 28	$1,896,099 19	

OFFICERS OF THE PHILADELPHIA WATER-WORKS.

Chief Engineer,
HENRY P. M. BIRKINBINE.

Register, W. J. P. WHITE.
Chief Clerk, THOMAS S. DARLING.

Permit Clerks,
JOSEPH M. SIMONS, CHARLES DIXEY,
JOSEPH AITKEN, CHARLES MEARS,
SIMON MUDGE.

Messenger—WILLIAM HAIGHT.

Inspectors,
ALEXANDER MCCONNELL, JOSEPH SWARTZ,
JOHN ORTH, JOSEPH HEMPHILL.

Purveyors,
1st Dist., C. B. COBB, Office, 615 Carpenter st.
2nd " D. B. MORRELL, " 918 Cherry st.
3rd " JOHN SEDDINGER, " 1420 Frankford rd.
4th " WM. H. DURBORROW, " 1324 Buttonwood st.

Clerks at Engineer's Office, CYRUS KRAUSER,
Draughtsman, JACOB H. YOCUM, Jr.

Engineers at Works,
Fairmount Works, CHRISTIAN HUGHES, JOSEPH MOYER,
Schuylkill " JOSHUA A. BARTLEY, WM. HODGES,
Delaware " BENJAMIN NORMAN, BENJ'N BERRY,
24th Ward " JAMES GREGORY, JAMES BUCKLEY.

CHICAGO, ILLS.—We have received a copy of the Chicago *Times* containing a decidedly sensation article of two columns length on the subject of gas-lighting, with a heading after the style of the New York *Herald* or the *Evening Post,* when they have got hold of something which they think will constitute a "sell."

This bi-column affair of the Chicago paper is a puff of Garrison's opposition company at the expense of the old company, but there is not much in it worth reading excepting the general subject of gas-lighting, which the writer evidently prigged from the AMERICAN GAS-LIGHT JOURNAL, without giving it the credit. *En passant,* it is refreshing to observe these knowing editors stealing so freely from our columns without a word of acknowledgment. This man of the Chicago *Times* would be sent to the Illinois Penitentiary for ten years if he had stolen as much value in the paper he prints on or the ink or type he prints with, as he has in the brains he has printed from, in the article before us.

The following extracts will show the *animus* of his remarks:

THE METHOD AND PROFIT OF GAS-MAKING.

The quantity and quality of gas are measured principally by the quality of coal used in the manufacture. The best coal in the world is the English cannel coal, considerable quantities of which are imported and used in New York and Boston. The manufactories mix about one-quarter of this coal with the Pennsylvania or the English Newcastle coals, and produce more gas than from American coal alone. The cannel coal yields from twelve to fifteen thousand feet of gas to a ton of coal, and the Newcastle yields eight and nine thousand feet, which is about the same as the best Pennsylvania coals. In explaining the manufacture of gas, we cannot do better than by bringing the matter home, taking as a basis the quantity and quality of gas manufactured by the Chicago Gas-Light and Coke Company. This gas is made of Ohio and Pennsylvania coal, which ordinary customers buy, in the navigation season, for $5 a ton. We may, therefore, presume that its cost on the docks here is less than $4 a ton, which is

the actual fact. We will take that figure, however, as a basis, and make a calculation of the cost of manufacturing gas. A ton of coal produces, on the average, eight thousand feet of gas. This sells at $2 50 a thousand, or $20 for eight thousand. There is a product of from twenty-seven to forty bushels of coke from the ton of coal, which sells at a shilling a bushel. Call it twenty-four bushels and we have $3. There is in the neighborhood of half a barrel of tar, and the same quantity of ammoniacal liquids, worth at least $1. Counting these up we have $20 for gas, $3 for coke, and $1 for tar and other liquids, all from a ton of coal. The coal cost $4, and the combined products give $24, by which it will be seen that the gas costs nothing, the coke and tar bringing back the amount paid out for the coal. The company manufactures 400,000 feet a day, using fifty tons of coal in the process. The coal costs $200, and the gas, coke, &c., sell for $1,200, leaving $1,000 a day to pay running expenses, cost of purifying, &c. Fuel costs nothing, as the retorts are heated by coke. Taking 150 employees at $1 50 a day we have $225 for wages, which, with $75 more for purifying and other minor expenses, probably covers the whole amount. This leaves a clear profit of $700 a day on gas, at $2 50 a thousand. It can be furnished at $1 50 a thousand, and then coin money for the manufacturers. The city of Chicago pays $2 a thousand for gas to light the street lamps, and the city of Detroit pays $1 50—a fact which should alone demonstrate that the public are being greatly overcharged for their gas. We look for a time when a dollar and a-half a thousand will be the highest rate paid. In England no such prices are known. Gas in Birmingham costs about 87½ cents a thousand, and in London and Liverpool it is lower than in any city in America, except, perhaps, Pittsburgh, where it costs $1 50. In the majority of our cities and towns it ranks from $3 50 upward. In Watertown, N. Y., at last reports, the price was $7 a thousand, and at Belfast, Me., and some other places in the vicinity, the same price was charged. At St. Paul, Minn., $6 has been the regular rate until the present season.

The following table shows the statistics of gas in the principal cities of the United States for 1860, including the amount manufactured, the price charged to consumers, and the cost of coal:

	Amount.	*Price.*	*Cost of Coal.*
New York	1,155,321,000	$2 50	$6 50 to $11 00
Philadelphia	432,000,000	2 13	6 50
Boston	200,000,000	2 50	5 00 to 12 00
Brooklyn	163,000,000	2 85	7 28 to 8 15
Cincinnati	96,000,000	2 50	3 46
St. Louis	74,500,000	3 50	6 00
Pittsburgh	54,720,000	1 50	1 25
Providence	41,000,000	3 00	7 20
Albany	40,000,000	3 00	5 75
Louisville	34,000,000	3 00	3 50
Richmond, Va	27,000,000	2 85	4 15
Rochester	25,000,000	3 00	4 38
Cleveland	20,000,000	3 00	3 00
Detroit	20,000,000	3 50	4 00
Milwaukee	19,000,000	3 50	4 00
Winchester, Va	15,000,000	4 00	6 40
Allegheny City	10,000,000	3 00	1 45

THE MEASUREMENT.

The measurement of gas is a matter of interest to every citizen, inasmuch as the bill follows immediately after. This is done by the gas-meter, which is placed in every house. People know well enough what a gas-meter is—that is, they know what it looks like on the outside, but the mysterious interior is never revealed to them. The consumer takes his monthly bill in his hand, and goes and looks at his meter, and wonders how so small a concern can run up so large a bill. That is all the knowledge he gains from it, and he naturally leaves it in despair of ever getting an insight into the incomprehensible problem. Still it is very simple. The meter has a revolving cylinder inside, which is half immersed in water. It is divided into four sections, and, receiving gas at the axis, the flow of which causes it to revolve, one section rises at a time from the water, and gives out a cup-full of gas. As water is the only medium by which gas can be conveniently handled, it must be kept constantly in the meter, and always should be at a certain height. If it is kept clear up to the mark the gas will pass slowly, but if it is allowed to get low larger quantities are admitted, and the gas runs through much faster. The gas companies take no pains to inform consumers of these facts, but everybody can inform themselves. The little tubes that admit water are covered by caps, which can be unscrewed any time to put in the water. By tipping up the meter in certain directions it can be made to pass the gas without registering at all. In any event, they are unreliable and incorrect. The same meters register unaccountable quantities one month, and the reverse the next month, and often they register without passing the gas at all, as occurs when a disgusted customer quits gas and burns kerosene, and, at the end of the month, finds the usual bill presented to him. This is caused by random figuring in the gas-office, where the returns are made up. Knowing the feeble tenure by which they hold their volatile product, and the uncertain nature of the measuring apparatus, they constantly suspect it of playing pranks, and, if the returns from a certain meter fall short, an average is made, equal to the preceding month, or the corresponding month of the last year, and the consumer is charged accordingly. This is settled practice with gas companies, all the world over. A bill never goes out of the office until it has been compared with the bill of the last month, or of the preceding year; and, if it differs widely, it is altered to suit. So our readers may know what to anticipate, and we warn them that they need not expect to gain much by curtailing on gas, by the use of lamps, &c., as the usual average will be charged, no matter what they burn. Having had much practical knowledge in the matter, the writer knows these practices to be a settled policy with the manufacturers.

THE NEW GAS COMPANY.

The only method by which monopolies can be brought to believe that they are not omnipotent, is by fostering the spirit of opposition. The Chicago Gas-Light and Coke Company has been a monopoly in every sense of the word, and has made the fact known in various disagreeable ways. It kept the price of gas up to $3 50 until compelled, by its avowed object, of crushing out a new company, to lower it to $2 50. It demands of every consumer a deposit of ten dollars before the gas is furnished at all, and compels them to pay for service pipes which belong to the company to furnish. A delay of a few days in the payment of a bill, which often happens to the best in these hard times, brings an impertinent official to shut off the supply; and in various other ways a disposition to show no accommodation is manifested. All this is, however, in a fair way to end. The opposition gas company is nearly ready for operations, and will commence furnishing gas in March next. After numerous difficulties and drawbacks, under which the project hung fire, it has been taken in hand by a celebrated New York capitalist, who advanced all the means necessary, and is disposed to see the thing through in short order. The works are nearly completed, at the foot of Rucker street, on the South Branch, where grounds were purchased some time since for $35,000. Twelve miles of pipe are already laid, including the whole of Lake street on the South Side, and portions of Canal, Halsted, Jefferson, Desplaines, Harrison, and many other streets on the west side. The works are being erected with a view to the use of Illinois coal, extensive purifying apparatus being provided on account of the peculiar nature of the coal. If the effort is successful, and Illinois coal can be reduced to this object, the cost of gas will be greatly lowered. We see no reason why it should not be so used. Michigan coal is used in the manufacture of gas all along the Michigan Central Railroad, and it is much less pure than the Illinois coal. The desulphurizing process which has lately been introduced, will perhaps aid in the accomplishment of the object. At all events, the new gas company is a fixed fact, and within three months we shall have it in full operation.

PROVIDENCE, R. I.—The City Counsel of Providence have concluded a contract with the Providence Gas-Light Company for a supply of gas for the city, for the term of three years from January 1st, 1862. The price is $2 50 for each 1,000 feet, which is seven cents for 1,000 feet less than the contract which expired on 1st of January last. Supposing the same amount of gas to be consumnd by the city as last year, the new contract will make a saving of about $500 per annum.

ANSWERS TO CORRESPONDENTS.

A. J. D., of Mass.—*The author you quote is a standard authority, and well qualified to instruct in all the details of the science. But you labor under misapprehensions as to his meaning in the instance cited. The fact is just the reverse of your interpretation of it. We are sure you will notice this on a more careful perusal.*

F. J. McD., of Pa.—*A few copies only of the report were printed for gratuitous distribution, but so long a time has elapsed, that it is doubtful whether one can be procured. We will forward one to you if we are fortunate enough to obtain a copy.*

A. H., of Del.—*The substance you propose is by no means new, as its use for purifying gas is old- and included in several patents in England. Hardly a salt can be named but has been suggested as an agent for effecting the purification of gas. Lime is, after all, the most valuable material, and in this country continues to be the main substance used.*

O. W. B., of N. Y.—*It has long been known that a beautiful illuminating gas can be distilled from petroleum or coal oil, but the principal difficulty has been a want of permanence. The product has presented the appearance of being a compound of hydro-carbon vapors, liable at any time to condense and deposit in drops. Some experimenters claim to have avoided this result, but they have not yet proved the reliability of their assertions. It would be a fortunate circumstance for consumers if this were the case.*

D. J. W., of Ohio.—*The names most famous in the history of water-gas are those of Donovan, Manby, Val Marino, Radley, Lowe, White, Croll, Webster, Barlow, Gore, Paine, and Sanders. The principle of their inventions is essentially the same, although they differ in details.*

S. B. J., of Ind.—*Benzol solidifies at 32° F., and in this condition bears a strong resemblance to camphor. It is so extremely volatile and combustible, that a stream of hydrogen passed through it burns with a beautifully luminous flame. Common air passed through this liquid will likewise burn with a bright flame—or rather it is the vapor of the benzol with which the air is saturated which produces the light.*

T. M. P., of Minn.—*One volume of olefiant gas requires three volumes of oxygen to insure its perfect combustion, the result of which is two volumes of carbonic acid gas.*

E. V. C., of Pa.—*We should like to have further particulars as to the results of your experiments. Although the general opinion of the scientific world is adverse to your theory, still we are open to conviction, and will, if convinced, have no hesitation in expressing ourselves accordingly.*

B. T., of Md.—*The Company you refer to is a private corporation, and not connected in any way with the municipal government.*

STOKER.—*Your communication is received. Will make an effort to fulfill your desire. Your purpose is laudable, and merits encouragement, and at the same time exhibits a prudence which is too often forgotten under similar circumstances.*

CITIZENS' GAS-LIGHT COMPANY OF BROOKLYN, N. Y.—During the month of December, 1861, 7,168,000 feet of gas was produced, The average yield of gas per bench of 5 retorts each, was 29,369 feet per day, or 5,873 feet for each retort per day.

1,363 pounds of coal was carbonized by each retort every twenty-four hours. The coal was used in the proportion of 56 3-10ths per cent. of cannel, and 43 7-10ths per cent. of caking. The coal was wet, and had been exposed to the weather for months.

In January, 1862, 6,450,000 feet of gas was manufactured, and the yield per bench was 29,470 feet per day, or for each retort 5,894 feet per day, and 1,374 9-10ths pounds of coal were carbonized by each retort every 24 hours. In January the coal was carbonized in the proportion of 60 per cent. of cannel and 40 per cent. of caking. For the first twenty days of the month, the caking coal that was used had never been under cover, and was, consequently, very wet.

The retorts are 12 by 20 inches, and 8 feet 4 inches long, inside measure; they are D shaped clay retorts.

The average yield of gas per ton of coal in December was 9,638 feet, and in January, 9,750.

GAS IN SOUTH AMERICA.—The Cabildo of Panama, New Grenada, have just made some very important amendments to the charter of the Gas-Light Company of that city, extending the privilege to fifty years, at the end of which date, the property will either continue with the stockholders, or be taken by the city at the sum agreed upon in accordance with the charter stipulations.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

LIGHT, HEAT, WATER-SUPPLY AND SEWERAGE.

Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

THERE ARE 20,000 CITIES AND TOWNS IN THE UNITED STATES, CAPABLE OF SUPPORTING GAS-WORKS, WHILE THERE ARE NOT 400 GAS-WORKS IN OPERATION IN THE WHOLE COUNTRY!!!

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THE
AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

PROPRIETOR, JOHN B. MURRAY. | EDITOR, C. ELTON BUCK.

SATURDAY, MARCH 1, 1862.

THE price at which illuminating gas can be made and distributed is a very important question, particularly in those places where new works have been projected, and the future consumers are altogether unused to any mode of illumination than that furnished by the old-fashioned lamps and candles. In fixing upon a rate at which gas is to be sold, comparisons are instituted between the price ruling in localities somewhat similarly situated, and the question is often settled by adventitious circumstances, which, but for some unforeseen occurrence, would have been decided in a manner more beneficial to both shareholders and consumers. It cannot be questioned that frequently a grasping spirit is exhibited by new gas companies, which sound judgment cannot but condemn. A too eager desire is manifested by shareholders to reap quick returns in the shape of dividends, and the ultimate prosperity of the company, as enhanced by lower prices and an increasing number of consumers, is too often lost sight of. This state of things is more liable to occur in small towns, where the people have been long accustomed to practice the severest economy, and who cling to former habits with great tenacity. Many instances of this nature have been observed in the history of British gas-light companies, in some of which prices have been kept up, while the addition of consumers has been very slow. On the contrary, in other companies, where a more liberal spirit has been manifested, and a future increase of business rather than present profit has been sought, a permanent degree of prosperity has been attained, far distancing some of the companies who pursued a different course. Our tables of American Gas-Light Companies, published on pages 198 and 199 of this volume, furnish a statement of the price charged by the various companies, and other statistics of value. From these tables it will be seen that the price of gas, in the United States, varies all the way from $1.50 to $12.50 per thousand cubic feet. For the purpose of reviewing the average cost of gas to consumers, we have classified the figures charged in the various localities, and are thus enabled to present them in a more intelligible shape than when arranged merely in alphabetical order. There are, altogether, 420 gas-light companies in the United States, of which 384 manufacture coal-gas, 30 rosin-gas, 1 wood-gas, and 3 water-gas. Of the coal-gas companies, our tables give the rates charged by 380 of them. Beginning at the companies whose product is sold at the lowest rate, the Brooklyn, N. Y., and Pittsburgh, Pa., gas-light companies head the column—they disposing of their product at the remarkably low figure of $1.50 per thousand cubic feet. The Marysville, Cal., Gas-Light Company brings up the rear, with the exorbitant price of $12.50 per thousand cubic feet.

There are

2	companies	charging	per	1,000	c. f.	$1 50
2	"	"	"	"	.....	2 00
3	"	"	"	"	.....	2 25
9	"	"	"	"	.....	2 50
1	"	"	"	"	.....	2 70
1	"	"	"	"	.....	2 90
32	"	"	"	"	.....	3 00
1	"	"	"	"	.....	3 10
1	"	"	"	"	.....	3 20
1	"	"	"	"	.....	3 24
4	"	"	"	"	.....	3 25
62	"	"	"	"	.....	3 50
10	"	"	"	"	.....	3 60
1	"	"	"	"	.....	3 62
2	"	"	"	"	.....	3 70
3	"	"	"	"	.....	3 75
9	"	"	"	"	.....	3 80
1	"	"	"	"	.....	3 86
172	"	"	"	"	.....	4 00
1	"	"	"	"	.....	4 40
18	"	"	"	"	.. ..	4 50
19	"	"	"	"	.....	5 00
1	"	"	"	"	.....	5 40
11	"	"	"	"	.....	6 00
1	"	"	"	"	.....	6 70
2	"	"	"	"	.....	7 00
2	"	"	"	"	.....	8 00
7	"	"	"	"	.....	10 00
1	"	"	"	"	.....	12 50

The average price of coal-gas in the United States, as computed from the above figures, is within a fraction of $4 06 per thousand cubic feet. In this calculation the prices of the California gas-light companies are included, which are much higher than those charged in any of the older States, owing to a variety of circumstances, and the proportional expense of other necessaries of living.

In view of the price of gas which obtains in other countries, this average must be considered as high—too high for the mutual benefit of producers and consumers—especially when kerosene oil presents so many claims upon the attention of the public as an economical illuminating agent. Notwithstanding the danger attending the promiscuous use of some descriptions of this oil, and which is almost the only drawback to its adoption, it is used to an enormous extent, and has doubtless retarded the construction of gas-works in many places—particularly in the Western States. The cheapness of kerosene oil is easily demonstrated, and light for light, it runs a successful competition with gas, assuming the average price of the latter article as a standard. Gas engineers would do well to look this matter in the face, and act accordingly. The fact may be unpleasant to contemplate, but it is nevertheless patent to all who will take the trouble to examine it.

We have always opposed senseless agitations respecting reductions in the price of gas, and on page 248 exhibited the fallacy of the arguments generally adopted by such agitators. But while condemning such diatribes as are usually fulminated on this subject, we deem it a matter worthy of mature reflection whether the general interests of shareholders would not be better served, and a large additional consumption attained, by gradual and prudent concessions. At any rate, a perusal of statistics like the above may be suggestive, and we commend the subject to the consideration of the profession generally.

In consequence of the recent reports of Dr. LETHEBY and Mr. HAYWOOD to the City Commission of Sewers, in London, recommending the extra carburation of gas supplied to the city lamps, attention has been drawn to the subject, and already plans for effecting the naphthalization have been submitted both in this country and in England. On page 133 of this volume we gave an illustration of GWYNNE'S gas carbonizer, which is said to perform its work with great satisfaction, accomplishing a saving in gas bills which must commend it to consumers generally. Other modifications of apparatus for this purpose have been brought before the public, and it remains to be seen whether their adoption will become general.

The idea of increasing the illuminating power of gas, by saturating it with the vapor of a volatile hydrocarbon, was first suggested by Mr. LOWE, who, many years ago, proposed to pass gas through naphtha. The prospect of so largely reducing the amounts of gas bills by this expedient, which seemed imminent, was not by any means pleasing to the gas companies, who opposed the innovation with considerable energy. In consequence of this opposition, very few consumers adopted the suggestion, the companies being successful in the resistance which they interposed. In addition to the antagonism offered by the gas companies, insurance companies likewise placed obstacles in the way of the new invention, under the plea that an inflammable substance, such as naphtha, would render their risks more hazardous. The futility of this reason must be apparent to all; and the fact that many more inflammable substances are in daily use in many households, with no remonstrance being urged against them, suggests the idea that some undue influence must have been brought to bear upon the insurance companies, or that the dangerous nature of naphtha must have been described to them with a too generous use of depreciatory adjectives. Mr. LOWE'S original idea was to fill an ordinary wet meter with naphtha, so that the gas might be measured and rendered more luminous at the same time. This plan proving objectionable, a box containing a number of shelves, and separated into partitions, was substituted for it. The naphtha was either poured upon the shelves in small quantities at a time, or sponges or cloths, saturated with the liquid, were placed upon them. The gas was made to traverse over and around the hydrocarbon, and was thus rendered highly luminous.

One of the great advantages claimed for naphthalized gas, in addition to that of economy, is that much less heat is generated than when gas alone is used. Those who are familiar with the subject, and who have experimented upon both methods of burning gas, say that light for light, the heating power of naphthalized gas is to that of ordinary gas in the ratio of three to four. In summing up the recommendations of naphthalized gas, KNAPP says that its light is more analagous to that of the sun, and that objects illuminated by it, particularly the face, assume a much more natural appearance, and do not partake of the pallid hue which is peculiar to all objects illuminated by ordinary coal-gas.

It is stated by correspondents of the daily newspapers, that some sweeping reforms are about being inaugurated by the New York State Legislature, now in session at Albany. Among the offices which rumor states are to be abolished, is that of the inspector of gas-meters. If this be true, it is an unfortunate movement, to say the least of it. We have repeatedly referred to the importance of this office, and to the able manner in which the present incumbent fulfills his duties. We trust the rumor in question may prove premature, and hope that the good sense of the members of the Legislature may induce them to see that a real wrong would be perpetrated by the repeal of the act establishing the office.

STERLING COAL.—We direct the attention of gas companies to the advertisement of Messrs. F. BUTTS & Co., the enterprising proprietors of this excellent coal. Messrs. BUTTS & Co. are making arrangements for an extensive business this spring, and our Atlantic gas companies should communicate with them before buying elsewhere.

REPORTS OF GAS INSPECTORS.

BALTIMORE, MD.

For the week ending February 13, 1862.

Illuminating power, in Candles.	Sulphur, grs. in 100 cubic feet.	Ammoniacal Gas.	Sulphuretted Hydrogen Gas.	Carbonic Acid Gas.	Pressure in Main, Maximum.	Pressure in Main, Minimum.	Burning pressure during trial of Gas.	Maximum illuminating power.	Minimum illuminating, power.	Bromine condensation per cent.
16.78	less than 5 grains.	in excess.	none	none	3 3 / 10	1 5 / 10	2 / 10	18.	15.12	5.50

WILLIAM E. A. AIKIN,
Inspector of Illuminating Gas.

REMARKS.

The average night pressure, during the past week, has been 3 65 inches, and the average day pressure has been 1.64 inches of water.

For the week ending February 20, 1862.

Illuminating power, in Candles.	Sulphur, grs. in 100 cubic feet.	Ammoniacal Gas.	Sulphuretted Hydrogen Gas.	Carbonic Acid Gas.	Pressure in Main, Maximum.	Pressure in Main, Minimum.	Burning pressure during trial of Gas.	Maximum illuminating power.	Minimum illuminating power	Bromine condensation per cent.
17.	less than 5 grains.	in excess.	none	none	3 3 / 10	1 4 / 10	2 / 10	17.5	16.	5.75

WILLIAM E. A. AIKIN,
Inspector of Illuminating Gas

REMARKS.

The average night pressure for the past week has been equal to that of a column of water 3.73 inches in height, and the average day pressure equal to a column of water 1.46 inches high.

GAS-WORKS WANTED.—An advertisement appears in this number to the effect that a gas-works is wanted to lease. Any gas-works within a hundred miles of New York may obtain a liberal rent for a term of years.

GAS-LIGHTING.

ON SOME RECENT IMPROVEMENTS IN PUBLIC LIGHTING BY THE USE OF REGULATORS, AND MORE CONVENIENT MODES OF LIGHING AND EXTINGUISHING THE LAMPS.

BY SAMUEL HUGHES, ESQ., F. G. S.

(*Continued from page* 247.)

I.—REGULATORS FOR STREET LAMPS.

Soon after the introduction of gas for lighting purposes it was found essential to have some means of regulating the pressure, and of keeping this uniform, independently of the gas-holders and of the draught on the mains. The governor was accordingly designed to answer this purpose. It consists essentially of a small gas-holder with an inlet and outlet pipe. The inlet pipe is provided with a cone, which rises with the gas-holder as the pressure of the gas increases and on the contrary falls when the pressure of the gas decreases. The rise of the cone checks the passage of the gas, while the falling of it opens a freer passage; and thus the rise and fall of the cone regulates the admission of gas, inversely as the pressure; admitting less gas as the pressure increases, and more gas as the pressure decreases.

When a governor acts properly the volume of gas which it admits to pass from a gas-holder to a main, should be uniform and invariable, whatever be the pressure on the holder, and whatever be the draught on the main.

The governor is particularly described and shown by a drawing in my treatise on gas-works, published in Weales' Rudimentary Series, page 230.

Smaller instruments on the principle of the large governor have long been used to regulate the pressure of gas in large buildings. These require to be applied on each floor where the building is extensive, and so long as they are in order, and are properly attended to, there is no doubt they effect the desired end.

In hotels and large buildings of a public character where it is difficult to exercise a minute control over the servants, it is possible that these regulators may afford the best means of producing a uniform pressure on the gas, and thus regulating the consumption so as to prevent waste on the one hand, and an insufficient supply on the other.

It is perfectly within the power of any private consumer, however, to regulate his own supply of gas without the use of the special instrument called the regulator.

The great mistake made by private consumers is that of attempting to regulate the gas at each individual burner by partly closing the tap so as to check the passage of the gas, to reduce the pressure and form a flame of the required size. Now, gas never burns properly under these circumstances. The current of gas being impeded by the partial closing of the tap is deflected against the side of the pipe and issues in an irregular manner; the consequence is an irregular jagged flame which gives much less than the proper quantity of light.

The best method is to have all the taps of the individual burners turned full on so as to interpose no obstacle to the passage of gas near the point of combustion, and to effect the regulation at the meter. The gas has then time to recover itself before coming to the burners, and the flames are always regular and uniform in outline.

The regulation at the meter will serve for the supply of gas on the same floor, and on the floor above it. Thus if the meter be placed as usual in the basement, the regulation, by means of the meter cock, will regulate the pressure on the basement, and on the ground floor immediately above it.

In large buildings, however, where the gas has to be burnt on several floors in succession, there should be a regulating cock on each floor, and by means of these, and regulation at the meter, the most perfect uniformity of burning can be attained.

Should the pressure vary during the hours of burning, this may be adjusted, either at the meter, or by means of the regulating taps on each separate floor.

The advantages of this practice will at once he obvious in a variety of cases, where it is otherwise impossible to control the carelessness and inadvertence of persons to whom the use and management of gas are entrusted. Thus, suppose the master of an establishment trusts to the mere regulation at the burners, it is evidently in the power of any inmates of the rooms having access to the burners to waste the gas to an almost unlimited extent. But supposing the taps at the burners turned full on and the supply adjusted from an independent source, it is evident that no more gas can be had than that which is intended, and for which the pressure is adapted. Consumers of gas would effect a great saving by a little attention to this matter.

These things are generally managed better in the North of England than elsewhere in this country, but even amongst the knowing natives of the North I have frequently been in pubilc rooms where a perpetual annoyance was caused by gas roaring and hissing through the burners, and the comfort of the guests continually interfered with by efforts of their own and those of the attendants to adjust the supply of gas by means of the burner taps. Now this could have been effected at once at the meter, and, the burner taps being fully open, the gas would have burnt in peace and quietness with, at the same time, a large increase of illuminating power.

It is not unusual to hear complaints of the trouble and inconvenience occasioned by having to resort to the meter for the purpose of adjusting the supply of gas; and it must be confessed there is some justice in this complaint when the operator is obliged to resort to the debased locality in which the meter is commonly fixed.

By a very simple contrivance, however, the power of a gauge on the meter can be transferred to any part of the house, and there might be a dial, ornamental or otherwise, fixed in the most handsome dining-room or study, or any other part of the house, showing at a glance the degree to which the inlet of the meter was opened, and affording the means of regulating the supply by applying a key to an opening in the dial, just as simply as we turn the hands of a watch.

A contrivance of this kind is common in Leeds and other towns in the North of England. The dial and other apparatus can be procured from Carnaby, of Skinner street, Snow Hill, London.

Let us return from this digression to the subject of regulators for street lamps. These, again, are still smaller affairs than the regulators which have been spoken of for rendering the pressure uniform in large buildings. The regulators for street lamps are, in fact, miniature governors applied to single lights. Like their larger prototypes they are all based on the original idea of the governor, and, with trifling modifications, they may all be described as miniature governors applied to single lights.

Like the great station governor employed to regulate the pressure of gas into mains of the largest capacity, these miniature instruments all embrace the fundamental principle of a gas-holder provided with an inlet and an outlet pipe, the former being furnished with movable cone acted on by the entering gas, just as in the larger machine.

In some of the regulators, however, such as Sugg's, and Paddon's, and Ford's, the gas-holder is of the dry form, with flexible sides, such as have been made on the large scale for exportation and use in our colonies, and foreign countries. In others, such a Clybran's mercurial regulator, the holder is of the ordinary bell shape, and works in mercury instead of water.

FIG:1.

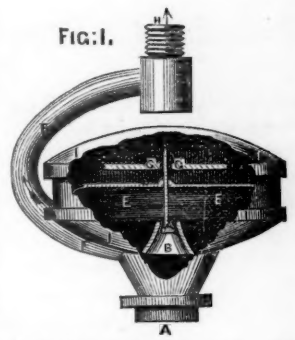


Fig. 1 is a full-sized representation of the regulator designed and manufactured by Mr. William Sugg, of Marsham street, Westminster. This regulator was first adopted by the Chartered Gas Company in the Westminster district, comprising the parishes of St. Margaret and St. John the Evangelist. It has since been largely adopted by the Imperial, the Western, and other companies.

DESCRIPTION OF SUGG'S GOVERNOR.

A is the inlet pipe which screws on to service pipe of the lamp or lantern.

B is the conical inlet chamber.

C is the half round ball-valve attached by a spindle to the top of the gas-holder, and which rises and checks the passage of the gas when the pressure increases, and, on the other hand, falls and admits more gas when the pressure diminishes.

D is a metal disc forming the top of the miniature gas-holder.

E is a flexible leathern cylinder enclosing the gas-holder.

F is the outlet tube proceeding from the interior of the gas-holder, and conveying the gas to the burners.

G G are leaden balance weights to regulate the pressure of the gas, so that when a given burner is used, a fixed volume of gas shall pass at all pressures exceeding the initial pressure with the regulator removed.

H is the screwed pipe to attach the burner on the adapter.

I the tinned external case of the regulator.

These regulators are sold at the price of 3s each.

PADDON'S AND FORD'S REGULATOR.

FIG:2.

Fig. 2 shows the regulator manufactured by Messrs. Paddon and Ford. These were first adopted in London by the Imperial Company for keeping down the pressure in the elevated parts of their district about Paddington and Hampstead Heath, and they have since been largely introduced in other parts of the metropolis.

DESCRIPTION.

A is the inlet which screws on to the service pipe of the street lamp.

B is the conical valve, formed of magnetized steel, which rises and checks the passage of the gas when the pressure is increased, and, on the other hand, falls and admits more gas when the pressure diminishes. This cone is attached by a spindle to the top of the dry gas-holder.

C is a soft iron case that attracts the cone and keeps it in its place.

D is a metal disc forming the top of the miniature gas-holder.

F is the soft flexible leather forming the side of the gas-holder.

G is the external case of the regulator.

H is the screwed pipe to attach the burner or adapter.

I is the screwed cone or adapter for the burner.

K is the burner.

L is the inlet pipe leading from the interior of the gas-holder to the burner.

CLYDRAN'S MERCURIAL REGULATOR.

FIG. 3.

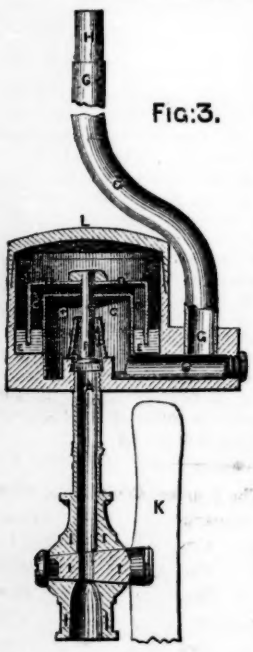


Fig. 3 is a sectional view of this regulator, as used in Bolton and some other Lancashire towns, with the peculiar form of tap adopted where the lamps are lighted by means of the lantern rod, without the aid of a ladder.

A is the socket for attaching the regulator to the screw of the stop-cock.

B the conical inlet for the gas.

C C spaces filled with gas when the regulator is in action.

D the bell of the miniature gas-holder.

E annular space containing the mercury in which the gas-holder works.

F valve and spindle attached to the gas-holder, which falls and admits more gas as the pressure decreases, and, on the contrary, rises and checks the passage of the gas as the pressure increases.

G outlet for the gas conveying it to the burner H.

I the stop-cock screwed to the service pipe.

K the lever of the stop-cock acted on by the hook of the lantern rod for turning the gas on or off.

L movable cover which is taken off when the mercury has to be added or replenished.

GENERAL REMARKS ON REGULATORS.

The use of these instruments has given rise some difference of opinion as to whether they are advantageous or otherwise for the public lighting.

In the first place they produce an almost perfect uniformity of flame, which is a great improvement on the old system, under which the flame, in some cases, varied during the course of the night, for 5 ft. an hour down to 1½ and 2 ft.

2d. The gas burns with a more uniform and steady light in consequence of the cock being fully open, and the passage for the gas being an annular one, formed of smooth and accurately turned surfaces. There is a considerable increase of illuminative power from this cause alone, even when the same quantity of gas is burnt. On the other hand, the system of using regulators is liable to considerable abuse. If the regulator be so adjusted that it cannot pass the full quantity of gas at the minimum pressure, it is evident the public is defrauded of the proper quantity of light.

2d. If the burners are too small, the use of the regulator interposes an obstacle to the passage of the gas which no adjustment of the taps can overcome.

3d. If the regulator, from any cause, be out of order, so that the cone does not freely descend as the pressure of the gas decreases, it is evident the proper quantity of gas cannot pass.

All these sources of error render it absolutely necessary that local authorities should have the regulators examined, properly adjusted, and fitted with suitable burners before being used.

Local authories should be as accurately informed as the companies themselves relative to the pressure which prevails in the district under their control, and for this purpose registering pressure gauges should be kept at work in several parts of the district. The registration on the pressure-sheets will at once show to any surveyor of ordinary intelligence, how the regulators should be adjusted, and then the whole, or a certain portion of the regulators should be tried, with their appropriate burners, before being placed on the public lamps.

It is an essential condition of the regulators that when they are used the taps beneath them are to be fully open. The regulators are all constructed to act on this principle, and if the tap be not fully open, it is quite certain that at some part of the night the proper quantity of gas will not pass. This condition of having the taps always turned on is one of the chief arguments in favor of the regulators. The sight of the tap full on satisfies the passer-by that justice is being done, and prevents a great deal of the dissatisfaction which has hitherto prevailed in consequence of the taps being at half cock, or something like it.

When local authorities burn by meter, as they invaribly should do, I recommend the use of the regulator in all cases, as it will contribute greatly to the saving of gas, will give a better light with the same quantity, and prevent the irregularity arising from the judgment of the lamplighter, however skilfully this judgment may be exercised.

CONTRIVANCES FOR LIGHTING AND EXTINGUISHING PUBLIC LAMPS WITHOUT THE USE OF LADDERS.

The practice of lighting by means of wands has been long practised in lofty rooms, where chandeliers and oil lamps have been lighted by means of a small taper affixed to the end of a long and slender wand. It has also been easy to apply the same principle to lofty interiors lighted with gas, as it was only necessary to add a small hook or projecting arm to act on the lever of the tap so as to turn on the gas.

In the open air, however, it becomes necessary to have a lantern at the end of a rod, so contrived as to burn in strong currents of wind and rain, and yet to be perfectly efficient when required for lighting a gas flame.

An apparatus of this kind has been used for some years in Paris for lighting the street lamps, and does not differ materially from that shown in Figs. 4 to 8, which represent the apparatus used in Manchester at the present time.

Fig. 4 is the elevation of the lamp and jointed rod.

Fig. 5 is the elevation of the jointed rod and lantern complete with its perforated cap.

Fig. 6 is a section of the rod and lantern with the cap on, showing the wick and oil case.

Fig. 7 is an elevation of the top piece used to replace the lantern when the lamps are being extinguished.

Fig. 8 is a section of the top piece.

The following description will render the figures more intelligible:

A is the lower joint of the rod, made of deal 3 ft. long by 1¼ in. diameter.

B is the upper joint of the rod, made of deal, 3 ft. long by ¾ in. diameter.

C is the clip for attaching the separate joint of the rod, and keeping them together in one piece.

D is the lamp.

E is the clip for attaching either the lamp or the tap piece to the upper rod.

F is the oil case or reservoir for the oil and wick.

G the wick.

H the perforated cap with openings for ventilation and for ejection of the gas.

I spring to attach the cap and keep it in its place.

K perforated dome-like space through which the gas passes in order to be ignited by the flames of the lamp.

L hook for closing or opening the top of the gas lamp.

M top piece with hook for extinguishing the lamps.

The mode of using the apparatus is so simple, as scarcely to require description. The wick being trimmed, and the lamp properly supplied with oil, the lamplighter goes forth with his jointed rod, and when he comes to a lamp, turns the tap on the service pipe by pressing it upwards with the hook L. The top of the lantern is then pushed up, and opens a small hinged glass plate in the bottom of the public lamp. At the same instant the issuing gas enters the perforations at K and becomes ignited. The rod is then withdrawn, the small hinged plate shuts down, and the cock, if necessary, is adjusted by a touch of the hook L.

FIG. 4.

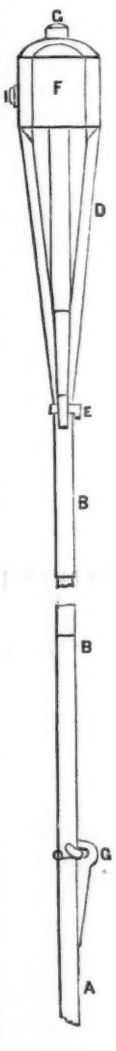


FIG. 5.

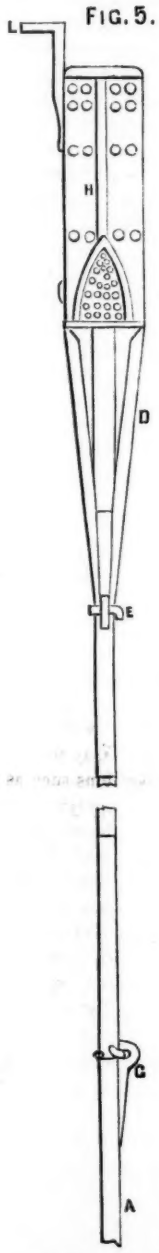


FIG. 6.

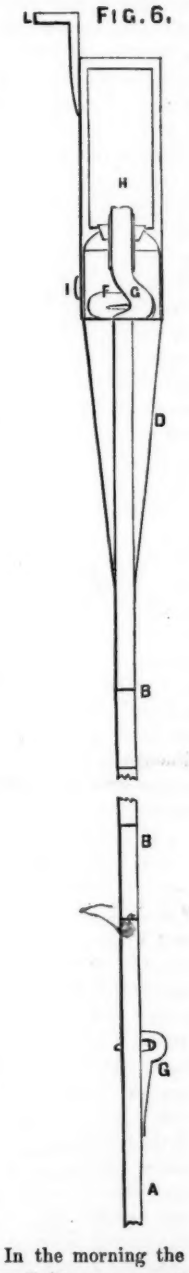


FIG. 7.

FIG. 8.

In the morning the lamplighter goes out without the lantern, in place of which he has the top piece M at the end of his rod. In extinguishing the lamp, of course there is no necessity for the rod to enter the street lamp at all, but merely for the hook to act on the tap which turns off the gas.

The whole apparatus is certainly simple and convenient, costing but a few shillings, while the alteration to the cock of the public lamp and putting a hinge to

the glass bottom of the lamp, costs less than a shilling.

The saving is measured by the fact that the lamp lighter, with less fatigue, and in the same time, lights 120 lamps in place of 100, and there is no necessity for a large stock of ladders, as these are only required for cleaning, so that one ladder is sufficient for the use of several lamplighters.

PARAFFINE AND THE AMERICAN MINERAL OILS.

The American mineral oil trade is becoming so important that it is believed we shall soon be importing it for distillation into gas instead of exporting coal for gas supply to America. At present it is said that no less than 20,000 barrels of petroleum, as it is sometimes called, are on their way to England. The importance of this trade may be conceived when it is considered that, besides the extraordinary extension of paraffine here for light in private dwellings, where it is used just as the American mineral oils are used in America; and also the probable adoption of it in many cases for distillation into gas; these oils are also used for various other purposes, as in the production of the fashionable dyes called Magenta, Roseine, &c.; the manufacture of solid paraffine candles, and for lubrication of machinery. But perhaps one of the most extensive uses to which the cheaper and more dangerous kinds of these oils is put, may be found to be the adulteration of the purer or safer forms, such as that distilled by Young from the Boghead mineral; and, since much of what is called petroline and paraffine is explosive and dangerous, the importance of the subject impresses itself all the more strongly on the public notice. It is questionable, too, whether much of the adulterating material be not of the nature of naphtha and camphene, which have been so long notorious in this respect.

A test of the specific gravity of all such oils was lately brought under notice; but what signifies the specific gravity if, as now appears, some of the worst kinds used be a mixture of oils of different specific gravities? An oil with too high a specific gravity to burn well in the peculiar kind of lamps now in use for such oils, may be mixed with explosive oils of a very low specific gravity, which will still be explosive, although the mixed material may show a good average specific gravity. Considerations such as these suggest a preference for the test of applying a lighted match to a very small quantity of the oil; when, if explosive, it will immediately burst into flame, but if good paraffine it will not so easily take light, while the best of all is that which requires a wick to enable it to burn by the mere application of a match. Mr. Herapath, the well-known chemist, now advises this plan, recommending a few drops to be spread upon a saucer or plate and touched with a lighted match. Some ingenious mechanic ought to apply himself to the further improvement of paraffine lamps; if we mistake not, they are at present improving in the wrong direction, so as to give less light with a greater expenditure of oil than formerly; and this is but too likely to be the case so long as the lamps are invented by those whose chief interest and desire is to sell (not these, but) their own peculiar oil. It is evident, too, that tradesmen who profess to be agents of respectable manufacturers make this a mere blind to enable them to sell dangerous oils got from other quarters because they are cheaper and yield more profit, even though the foolish knaves are thereby ultimately destroying their own business by disgusting the public with "paraffine," good, bad, or indifferent, on account of the uncertainty of this beautiful, cheap, and useful light, which, moreover, even apart from the explosive nature of the adulterating sorts, constitutes, when so adulterated, a perfect lampblack manufactory, from the immense volumes of smoke which it is perpetually apt to give off, even under pretty careful management.—*London Builder.*

GAS-LIGHT NOT INJURIOUS TO EYE-SIGHT.

The *Scientific American* gives the following, among other directions, in an article entitled "How to Save the Eyes:"

"By sitting in such a position as will allow the light to fall obliquely over the shoulder while reading or sewing.

"By not using the eyes for such purposes by an artificial light, especially gas-light."

The first of these directions is eminently proper, and if always observed would tend more to the preservation of eye-sight than any other plan, and in accordance with the theory "prevention is better than cure," is better than all the remedies in the world after the organs of vision have been injured. But the second direction is open to objections, which will be obvious on a careful examination of the subject. Of course immoderate straining of the eyes by any light would have a tendency to weaken them, but to a certain extent reading may be indulged in by any good artificial light with perfect impunity. As regards the influence of gas-light, which is "especially" denominated injurious the following extract from Mr. Rutter's little book on the advantages of gas-light in private houses, will show the other side of the question. Mr. Rutter's testimony could be endorsed by many other writers, who have affirmed the use of gas-light, when consumed in proper burners, to be innocent in every respect.

"Having taken more than ordinary pains in instituting inquiries on this subject, I unhesitatingly affirm, that I have never met with a case in which the eyesight of any person can be said to have been injured by the use of gas. In an establishment where about eighty assistants are constantly employed, and where there are upwards of seventy gas-burners, (and where from local circumstances the only light enjoyed, by day as well as night, in many parts of the premises, is that from gas,) I have never known an instance in which any ill effects have been produced upon the eyes, or the general health, of any individual. The parties here referred to have used gas these twenty-five years, and in their private dwelling as well as in their houses of business, and many of the persons now in their employ have been on the premises the greater part of the time just mentioned.

"The means are so exceedingly simple by which the exact quantity of light required in any particular occution is to be obtained that there can be no necessity for an excessive supply, and I am sure it has been found that a deficiency of light in performing even the most ordinary processes in domestic life, as reading, writing, and sewing, has operated more injuriously upon the eyes, than such a supply as enables persons to perform these, as well as operations of much greater difficulty, with the same facility as in day light."

In this connection it may be well to say that the complaints which are sometimes made against gas-light, are more attributable to the burner than to any other cause. The common fish-tail burner, which is more used than any other form, sometimes causes the gas to burn with an unsteady flickering flame. By using some of the improved forms of these burners, or better still, an Argand burner, a perfectly steady flame may be obtained, by which the most sensitive eye will not be injured.

THE LONDON TIMES ASSIFIED.—The London *Times* is great on American affairs. A year ago it announced that Mr. Lincoln would not have the assistance of *Webster* or Everett in his Cabinet, because they had allied themselves to his opponents! In a later number the *Times* gave us a remarkable geographical editorial on America, for which any school-boy of a dozen years old would deserve a spanking for ignorance. Now since the rebellion broke out, this immense humbug—we mean the London *Times*—has been stultifying its British readers with the most ridiculous articles about the "mob" that controls the Government and society of America, and hitching horses with Ass No. 2—we mean the fellow Russell, the *Times* correspondent here—it has not ceased its vituperation, lying, and calumny about us on every occasion.

The truth is that the *Times* is beginning to find the French breeching chafing the British hips; for it is well known that the insolence and audacity of Palmerston and the other Russell—we mean the Earl Russell—would have emboldened them to strike us while crippled by our home troubles, had not the CONTROLLING POWER on the other side of the channel put a veto upon it. There are various specimens of the asinego* in existence at present; among them, he of the London *Times* appears to be the chiefest.

* See Webster's Unabridged.

IMPORTANCE OF THE PETROLEUM TRADE.—The following extract from the last annual report of the Philadelphia and Erie Railroad Company, shows the magnitude of the business in petroleum, as will be seen from the statistics therein enumerated.

The increase of business during 1861, has been in a great measure owing to the enormous increase of the oil production of Northwestern Pennsylvania—the first dawnings of which were pointed out in our last Annual Report. The business arising from this new source is at present confined to the Western Division of the road, but as soon as the connection between the Eastern and Western Divisions shall be effected, will pass over nearly the whole length of the line, and of course add greatly to its revenue.

The remarkable increase of this fresh article of production and commerce, and for which our road is to be the most important outlet, is shown by the number of barrels of oil transported over it for the last three years:

In 1859, there were	.....	325	barrels.
1860, "	.....	2,249	"
1861, "	.....	134,927	"

44,393 barrels, in 1861, were delivered to the Atlantic and Great Western Railroad, at its connection made with the Philadelphia and Erie Railroad, in May last. It is asserted, and confidently believed, that nearly as much has found an outlet to market through other channels, and that as much remains stored in tanks and reservoirs in the neighborhood of the wells.

The monthly receipts of oil have been as follows:

January	15,092	August.....	17,197
February.....	9,621	September.....	18,375
March.....	4,384	October.....	16,429
April	5,521	November.....	8,131
May	7,228	December.....	13,369
June.....	7,685		
July.....	11,896	Total.....	134,927

Almost all this large yield is the product of the flowing wells—the pumping wells having become unprofitable, from the facility with which the oil can be obtained through the spontaneous production. This renders the vast yield the more remarkable. It may now be questioned whether this large amount of oil freight—all of which belongs of right to the road—will not soon demand railroad access, under the control of the company, to some point at or near the largest field of production. There are many who believe that if proper facilities of transportation were cheaply afforded, the region would yield from three-fourths of a million to a million of barrels per annum; provided the demand should continue to equal the supply. The product of the whole region has steadily continued to increase, from the time the first barrel was shipped, in November 1859, to the present day, and with greater prospect of continuance now, than at any time during that period.

NEW SAFETY LAMPS.—The London *Review* says that some modifications in the construction of safety lamps, which appear likely to prove serviceable in adding to the safety of these valuable instruments, have been made by Mr. Parkinson, of Manchester. In the first place, to prevent the lamp from being opened by the workmen in the pit, it is fastened by a screw sunk to some depth, and the depression over the head of the screw is filled in with solder. A blow-pipe must thus be used to melt the solder before the screw can be unloosed. Thirty lamps an hour can be fastened in this way. The plan of driving a plug of lead into the screw-hole has already been occasionally adopted, but the soldering is certainly a more efficacious plan. The second improvement seems a still more important one. An extinguisher is hung from the top of the inside of the lamp, the suspending wire being connected to it by a solder so tempered as to melt when the lamp becomes unduly heated. The extinguisher would then fall, and the light would be put out. The solder, it is affirmed, could be so made as to melt at any required temperature, and thus to insure the lamp from becoming heated enough to ignite any explosive gas which might be present in the pit.

FIELD OF CANNEL COAL.—A ton of cannel coal yields about 10,260 cubic feet of gas, the illuminating quality of which is nearly double that of gas obtained from common bituminous coal.

BALTIMORE, MD.—The expenses for lighting the city of Baltimore last year were as follows: For gas, $59,814 42; oil, $5,243 12; lamplighters, $16,867; repairs to lamps, $1,996 30; pillars, &c., lamps, $1,252 50—total, $85,173 34. During the year there was no material change in regard to gas mains laid in the city, nor in the number of consumers supplied by the gas company, from the report of the preceding year.

PATENTS.

UNITED STATES.

34,277.—Andrew Turnbull, of West Meriden, Conn., for Improvement in Lamps:

I claim combining with the tube, f, a spindle crank, l, snuffer or extinguisher, j, substantially as and for the purpose described.

34,293.—E. P. Dickie, of Fishkill Landing, N. Y., for Improved Chimney for Lamps:

I claim, in glass chimneys for illuminating purposes, the transparent partition or partial partition, d, when made part of and of the same piece as the chimney, substantially as and so as to realize the advantage set forth.

34,303.—A. S. King, of Commerce, Mich., for Improvement in Gas Retorts:

I claim, first, The employment of a movable cup, B, provided with a hollow cone, b, as its bottom, in combination with a retort, A, provided with a conical protuberance, a, at its bottom, and with a movable cap, C, substantially in the manner and for the purpose shown and described.

Second, The arrangement of the annular belt, E, in combination with the outer retort, A, and with the inner retort, D, as and for the purpose specified.

[This invention consists in the employment of a movable cup provided with a hollow cone at its bottom to fit over a conical protuberance projecting from the bottom of the retort, for the purpose of increasing the heating surface and spreading the material of which the gas is manufactured over a greater surface than can be done on a plain bottom, and also for retaining the residuum from the material used, so that said residuum may be readily removed from the retort by simply removing the cap, this operation being facilitated by having the cap or cover of the retort movable. It consists further in the arrangement of an annular chamber or belt in connection with the inner retort, for the purpose of preventing a draft of the gas in any one direction from the lower part of the retort, thereby allowing sufficient time for the perfect transformation of the material used into gas, and preventing the escape of the material in the form of vapor.]

34,309.—Jones Laubenstein, of Minersville, Pa., for Improvement in Coal Screens:

I claim an improved manufacture of screens for the screening and preparing of anthracite coal, or other coals and hard substances, similarly handled and prepared substantially as described.

34,318.—Addison Smith, of New York City, for Improvement in Rotary Blowers:

I claim the employment or use, for the purposes specified, of the external case, A, having induction and eduction openings, d e, in combination with the rotary cylinder, B, when the latter is provided with radial sliding pistons, C, placed eccentrically within the case, A, and has its pistons, C, operated or drawn in and out so that their outer edges will be kept in contact with the inner surface of the body, b, of the case, A, through the medium of the segments, F I, and grooves, f g, either or both of the latter being stationary or rotating, substantially as described.

34,324.—H. W. C. Tweddle, of Pittsburgh, Pa., for Improved Apparatus for Distilling Coal Oil and other Substances:

First, I claim the vacuum apparatus, R, with which, by the use of steam, I produce a vacuum.

Second, The use of the vacuum apparatus, R, arranged substantially as described, in combination with the receivers, L and M, or their equivalents.

Third, The use of the vacuum apparatus, R, in combination with the steam-pipe, F, arranged in the interior of the still, substantially as described.

34,332.—Christian Richman (assignor to Gustav Wedekind), of Philadelphia, Pa., for Improved Clasp for Lamp Shades:

I claim the clasp composed of the metal ring, D, having lips, f and h, formed by cutting the lower portion of the ring, and any convenient number of springs, m and n, or their equivalents, the whole being constructed and arranged for attachment to the shade and chimney of a lamp, substantially as set forth.

SEWAGE.—The filth which, under the veiled term of sewage, is allowed to ferment and fill our houses and streets with gases of ineffable subtlety, includes much more than mere water-closet liquescencies. There are the percolations of crammed churchyards, the rain-washings of the streets, alleys, and yards, which lick up as much as is soluble, and carry away with them even more of filthy objects, horse and cattle dung, sweepings and scrapings lying on their surfaces; refuse from hospitals, infirmaries, and dispensaries; fishmongers' and fishmarket washings and offal; slaughter-house offal; fellmongers', glue-makers', candle-makers', bone-dealers', tanners', knackers', scum-boilers', and tripe-dressers' liquid refuse; decayed leaves and vegetables; paper and rags; refuse from chemical works, gas-works, and dye-works; branches of trees from Hampstead ditches; dead rats, dead dogs and cats, and, sad to say, dead babies.—*Builder.*

GAS-WORKS WANTED AT THE SOUTH.—Now is the time of builders of gas-works to be up and doing. There is Port Royal, S. C., already the centre of attraction for northern enterprise and capital. There is Hilton Head, S. C., Roanoke Island, N. C., just now a little swampish, but will soon be reclaimed, and plenty of other places, that will soon be the scene of trade and commerce. Let our gas-works builders be up and doing. The time is coming to "strike a light."

STREET PIPE ARRANGEMENTS FOR EXTINGUISHING FIRES.—At a recent meeting of the Mechanical Section of the British Association, Mr. Bateman, President of the Section, made a communication on street pipe arrangements for extinguishing fires, in which the present mode of supplying water to fire-engines in London was criticised. In most large towns, as Manchester and Glasgow, for instance, where the supply of water had been taken into the hands of the corporation, the best preparations had been made for the extinction of fires. But in London, the fire-engines and the brigade were maintained by contributions from the different insurance companies, and it was therefore evident that their interest only lay in preventing the destruction of property that was insured. The speaker said, it was clear that this was a state of things which ought not to exist in this country. Some twelve or fifteen years ago, he turned his attention to the subject of the extinction of fires. The old wooden plug, or fire-cock, was then generally in use, and is still continued in some parts of the country. Mr. Bateman described the construction of the branch stand-pipe, with which he had replaced the old plugs in Manchester and other towns, and stated that as a general rule, these stand pipes had been found sufficient without the use of fire-engines. He also explained the principle upon which the water-pipes were laid down in Manchester; so that within reach of nearly every block of valuable buildings in Manchester and the neighborhood, there were from two to three sources of water-supply, and ten or twelve fire-cocks within a hundred yards. Then came the question of pressure. It was popularly supposed that water could be thrown to any height; but this was not so. About eighty or ninety feet was the greatest height water could be thrown by a fire-engine. The highest mills in Manchester were from forty feet to sixty feet, and experiments had been made to show that at the low pressure the stand-pipes would throw ninety feet.

HARTFORD, CONN.—This gas-light company has reduced the price of gas to $2 75 per thousand cubic feet. They claim to furnish seventeen candle gas.

BROOKLINE, MASS.—This gas-light company has declared a dividend of four per cent.

PORTABLE GAS-WORKS.

STRATTON & BROTHER'S PATENT GAS-WORKS, for making Gas from ROSIN or COAL OILS. STRATTON'S Patent Double Retort, for Coal, Wood, or Rosin.

Our Patent Gas Works have been put up in some forty Country Residences, Factories, Churches, &c., in which an experience of *ten years* gives entire satisfaction.

Water Works also put up in country residences. All work warranted.

Reference—Prof. JAS. C. BOOTH, U.S. Mint, Phila.
CHRISTOPHER FALLON, "
STRATTON & BROTHER,
719 Walnut street, Philadelphia.

BUTLER'S PATENT PORTABLE **ROSIN GAS-WORKS,**
FOR
Dwellings, Churches, Country Villages,
As well as for Consumers in Large Cities.
JOHN BUTLER,
No. 112 Fulton st. and 15 Henry st.,
Brooklyn, N. Y.

FOR LIGHTING RAILROAD CARS AND STEAMBOATS
☞ WITH GAS.
The whole process of Filling the Gas-Holders of a Railway Train, requires but Three Minutes.
Apply to the
NEW YORK CAR & STEAMBOAT GAS. CO.,
No. 117 Fulton st., N. Y.

C. R. WOODWORTH, Manufacturer of
PORTABLE GAS WORKS,
74 WALL STREET, NEW YORK CITY.

DRAIN-PIPE.

DRAIN PIPES, ENGLISH AND AMERICAN.
Garnkirk Chimney Tops,
Plumbers' Materials,
Minton's Encaustic Tiles.
For Sale by
MILLER & COATES,
279 Pearl st., New York.

NEWSPAPER WRAPPERS.
Mara's Patent Self Sealing and Folding Water-lined Newspaper Wrappers, $1.50 per 1000. Sold by all Booksellers and News Agents throughout the United States and Canada.
L. P. MARA, STATIONER,
418 Eighth Avenue, near 32d st.,
New York City.

GAS-COAL.

LIVERPOOL AND NEWCASTLE
CANNEL & COAL,
FOR
Gas-Manufacturers and House Use.
The careful shipment of the best qualities, of Cannel and Coal, at the lowest rates current at the time of engagement guaranteed.
T. W. PARMELE, Agt.,
No. 4 Irving Place, New York.

"PEASLEY CROSS" SUPERIOR HOUSE CANNEL.—The undersigned is receiving regular supplies of the above well-known and choice Cannel, selected carefully, for sale, ex ship or from store, in lots to suit purchasers, on reasonable terms.

Dealers can be supplied by lighters, at their yards, from ships Vanguard and New World, now discharging, and from other vessels to arrive.

Apply to RICHARD THACKRAY,
No. 44 Exchange Place.

F. BUTTS & CO. (Successors to BUTTS & KENDALL),
DEALERS IN THE CELEBATED
Sterling Coal
Pittsburgh and other Gas Coals,
P. O. DRAWER, 74,
CLEVELAND, OHIO.

GASOMETER RIVETS.

PHILLIPS & ALLEN, Pennsylvania Avenue, above 22d street, Philadelphia.—GASOMETER RIVETS of all kinds.

UNION WIRE-WORKS.

ROBERT McMURRAY & CO., No. 29 Fulton Street, New York, Manufacturers of Copper, Brass, and Iron Wire Cloth for Gas Works, all kinds of Foundry Riddles, Sieves, and Screens. Improved Wire Window Shades, Wire Bolting Cloth, Duster-Wire, Wire Cloth for fanning machines, Rosin, &c., Locomotive Wire, Fire Guards, Ornamental Wire Work of every description. Patent Improved Wove and Laid made Dandy Rolls repaired and designed to order.

GAS & WATER-METERS.

H. R. WORTHINGTON'S PATENT Water-Meter.—This Meter combines accuracy, simplicity and remarkable durability, with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.
HENRY R. WORTHINGTON,
61 Beekman street, N. Y.

JOSEPH LENNIG & CO., Nos. 313 & 315 New Market St., above Vine St., Philadelphia, Pa., Manufacturers of Wet and Dry Patent Gas-Meters, Station, Show, Customer, and Experimental Meters, Photometers; Pressure-Registers, Indicators, and Gauges; Governors, Meter-Provers, Centre-Seals, Fluid Gauges, &c. The flattering Testimonials we are receiving from Gas Officers, accompanied with expressions of such general satisfaction, and the fact of a tried experience for fourteen years, must present itself as a security to parties desirous of securing the most reliable Instruments. We therefore recommend our Patent Dry Gas-Meter, believing it superior to any Meter manufactured. Messrs. J. LENNIG & Co. confine their sole attention to the business of GAS-METER making. Our materials are the best in use; the strictest attention is given to workmanship, and we guarantee entire satisfaction to all purchasers. Purchasers may at any time inspect our Works, and the materials of which our Meters are manufactured. We are fully prepared to execute all orders, upon the shortest notice, and it will be to the interest of parties to call upon us. Each meter tested separately by a sworn Inspector, and sealed when desired. Meters repaired and forwarded with dispatch.

GAS THERMOMETERS FOR ascertaining and regulating the temperature of the gas while passing through the purifiers into the station meters. For sale at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

HOT WATER GAS STOVES, Manufactured by HUNTER, KELLER & Co., 144 Centre street, New York.
See Engravings on page 169, Vol. II. of this JOURNAL.

GLENDON COAL-OIL COMPANY of Boston, Massachusetts, incorporated June 1, 1859.
E. F. JONES & CO., Agents,
8 Kilby st., cor. Central, Boston, Mass.

GAS-METER FLUID.

FLUID FOR GAS-METERS.—The undersigned is prepared to furnish the Glycerine Meter Fluid in quantities to suit purchasers. *It does not evaporate, can be made to stand any degree of cold liable to occur in this country or in Canada, and does not corrode the metals of the meter. It has been in use successfully for the last three years.*

For particulars, references, &c., address the manufacturer, HENRY BOWER,
Box 363, Philadelphia, Pa.

STOP-COCKS, &C.,

DANIEL THOMPSON, Machinist and Manufacturer of Stop-Cocks, Fire-Plugs, &c., for Water-Works, Stop-Cocks, Valves, Drip Pumps, &c. for Gas-Works, No. 133 Elfreth Alley, Philadelphia.

ANTI-FREEZING APPARATUS.

FREEZING OF GAS-PIPES.—Walton's Patent Anti-Freezing Apparatus illustrated by Engravings in the AMERICAN GAS-LIGHT JOURNAL, of Jan. 1, 1861, page 212, is the most simple, durable and efficient of any known process.

See also certificates from Cincinnati, O., and Louisville, Ky. Gas-Works in same number, page
Address, JOHN WALTON,
Sup't Gas-Works, Louisville, Ky

HEATING APPARATUS.

JOSEPH NASON & CO., Constructors of Apparatus for Warming Public and Private Buildings by Steam and Hot Water.

Improved Fans for Ventilating Hospitals and other Public Buildings.
JOSEPH NASON,
HENRY R. WORTHINGTON,
No. 61 Beekman street, corner of Gold street, New York.

STEAM-PUMPS.

WORTHINGTON'S STEAM PUMPS, extensively used by Gas-Light Companies. For Sale at greatly Reduced Prices.

Also, a new and highly successful Pump, driven by water pressure, requiring no attention or repairs, and the most economical water motor yet constructed.

Patent GATES, for Water and Steam-stops.
HENRY R. WORTHINGTON,
61 Beekman street, N. Y.

THE
STERLING GAS-REGULATOR,
Improves the Light and Saves a Large Per Centage of Gas.

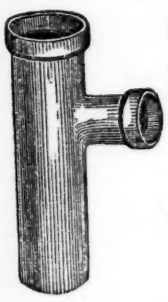
MANUFACTURED BY THE
WHEELER & WILSON SEWING MACHINE COMPANY.

It is well known that Printers require the best and most brilliant light In proof of the superiority of these Machines over all others, the following New York establishments are using them, and testify to their excellence:—New York Times, New York Herald, New York World, New York Tribune, New York Sun, Journal of Commerce, Courier & Enquirer, Evening Post, The Zietung, Dispatch, Leader, Scientific American, Advertiser and Spectator, Independent, Daily News, Harper's Monthly and Weekly, Transcript, Mercury, Atlas, Life Illustrated, Albion, Spirit of the Times, AMERICAN GAS-LIGHT JOURNAL, Christian Enquirer, Churchman, Church Journal, Christian Advocate, Christian Ambassador, Christian Intelligencer, Observer, Sunday Times, Sunday Courier.

By order of the New York and Brooklyn Common Councils, these Regulators are now used in the City Halls, Police Stations, Markets, and other Public Buildings in both cities.

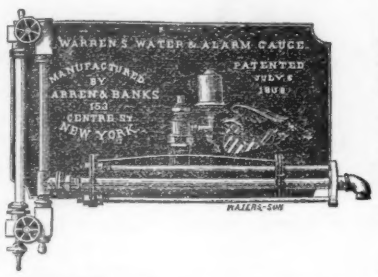
They are Warranted by the
WHEELER & WILSON SEWING-MACHINE CO.,
505 BROADWAY, NEW YORK,

To keep in order, and always maintain the pressurs of the Gas at the lowest point for a brilliant light and economical combustion. They are so constructed that *under no circumstances can the Mercury get into the Meters, or in any way injure them.*



GAS, STEAM, SMOKE,
PURE WATER & SOIL PIPE,
FROM
JOSEPH CLIFF
Wortley Fire-Brick Works, Leeds, England.
T. W. PARMELE, Agt.,
No. 4 Irving Place, N. Y.

WARREN'S PATENT WATER & ALARM GAUGE
For Protecting the Flues and Preventing Steam-Boiler Explosions.



This is a reliable High and Low Water Detector, arranged so as to render it one of the best Water Gauges ever attached to a Steam-Boiler; always presenting before the Engineer at sight the exact height of the water, and if, by oversight or by sudden leakage, the water gets low in the boiler, it will cause an alarm before the water gets below the flues, thereby preventing an explosion. This Gauge can be made to alarm at any point desired as a High Water Detector, thereby preventing the water from getting to that height as to be forced into the cylinder of the engine, often causing serious accidents. Thus it is a High as well as a Low water Detector. For sale by
WARREN & BANKS,
153 Centre st., corner of Canal st., New York,
Where a Gauge is constantly in operation.

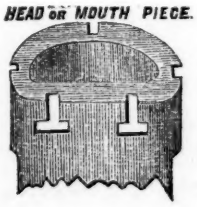
JOHN RUSSELL & CO.,
PATENT TUBE MAKERS,
THE OLD TUBE WORKS, WEDNESBURY, AND THE ALMA WORKS, WALSAL, STAFFORDSHIRE,
69 UPPER THAMES ST., & 5 CHARLES ST., SOHO, LONDON;
AND 35 GRANBY ROW, MANCHESTER, ENGLAND.

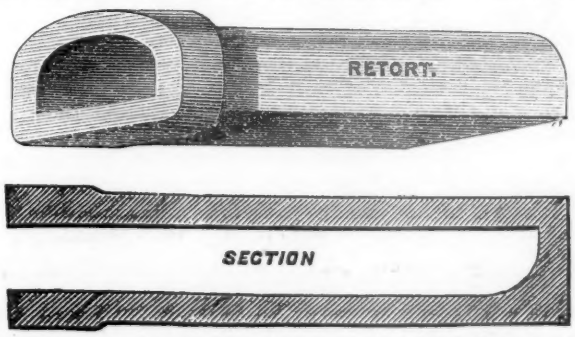
The original Manufacturers of WROUGHT-IRON GAS TUBES, and the Inventors of the Lap-welded Tubes for Locomotive and Marine Boilers. All kinds of TUBES and FITTINGS, whether for Gas, Steam, or Water. Galvanized and Composition Tubes. Chandeliers, and every kind of Brass work for Gas and Steam.

STOCKS, DIES, AND TAPS OF ALL SIZES. CAST-IRON PIPE AND GAS-METERS.
All Goods Warranted.

KING BROTHERS,
STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.

HEAD OR MOUTH PIECE.





HEAD OR MOUTH PIECE

KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

Free from Cracks and Correct in Form.

By great care in Manufacturing, combined with the advantages in Burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

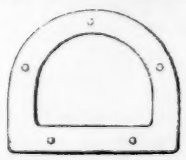
RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS, STOURBRIDGE."

Apply to E. W. BARSTOW, 13 Maiden Lane, New York, where samples can be seen.

HARRIS & PEARSON,
PROPRIETORS OF
Best Glass-House Pot & Crucible Clay.
Manufacturers of Fire-Bricks, Gas-Retorts, and Glass-House Furnace-Bricks of every description.
AMBLECOTE FIRE-CLAY AND BRICK WORKS, STOURBRIDGE, ENGLAND.

COWEN'S PATENT FIRE-CLAY RETORTS.



JOSEPH COWEN & CO.,
BLAYDON BURN, near Newcastle-on-Tyne, England,

Have always been, and are still, the most extensive manufacturers of FIRE-CLAY RETORTS in the United Kingdom, and were the only parties to whom a Prize Medal was awarded at the Great Exhibition, in London, 1851, for

"GAS RETORTS, AND OTHER OBJECTS IN FIRE-CLAY."

J. C. & CO. make Fire-Clay Retorts of all shapes and dimensions, and to fit existing mouth-pieces.

Orders for FIRE-CLAY RETORTS, TILES, BEARERS, and other articles in Fire-Clay, receive immediate attention, and are promptly executed at their Works, as above. Drawings of Settings adapted for Cowen's Patent Fire-Clay Retorts supplied.

AGENTS, MESSRS. MEAD & BELL,
13 CLIFF STREET, NEW YORK.

N. B.—J. C. & CO.'S RETORTS are well adapted for small Gas-Works, as they can be used without an Exhauster.

MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS.

MANUFACTORIES

SUFFOLK ST CLERKENWELL GREEN. & ALLEN ST. GOSWELL ST. LONDON.

BOSTON, Mass., 1 Barrett Street,—August 2, 1860.

RICHARD GLOVER

BEGS TO INFORM

GAS COMPANIES AND CONTRACTORS

THAT HE HAS ALWAYS ON HAND A LARGE ASSORTMENT OF

THOMAS GLOVER'S (of London) CELEBRATED

DRY GA METERS.

Thomas Glover's Meters have now been in use in the United States and British Provinces, for the last Fourteen Years, and are extensively used by many Gas Companies, to their entire satisfaction; and R. Glover can with all confidence refer to them in proof that Thomas Glover's Meters are— the most Perfect in Principles— the most Correct in Registration—and more Durable than any other Dry Gas Meter made in the United States or Great Britain. R. Glover will at all times be glad to repair any Gas Meters sent him at the above factory. If any of them are of Thomas Glover's manufacture, and of a more recent date than Three years, he will make no charge.

CODE, HOPPER & GRATZ,

1500, 1502 and 1504 FILBERT St., PHILADELPHIA.

MANUFACTURERS OF

Pressure Registers, Pressure Indicators,

Pressure Gauges, Photometers, Governors,

Station Meters, Customer Meters (Wet and Dry),

Experimental Meters (Wet and Dry),

Show Meters (Wet and Dry),

Meter Provers, Centre Seals, &c., &c.

The high reputation which we have enjoyed for more than twenty-two years, and the fact that we have manufactured a greater number of Gas-Meters than all other manufacturers in this country combined, must present itself as a security to parties desirous of securing the most reliable instruments. Having completed a most extensive addition to our Factory, and added many improvements to our machinery, we are enabled to fill orders entrusted to us with dispatch, and in all cases *guarantee entire satisfaction.* Our Patent Rotary-Valve Dry Gas-Meter is now used by upwards of Two Hundred Gas Companies, giving general satisfaction; we therefore recommend it, believing it superior to any other Dry Gas-Meter manufactured. All Meters tested separately by a sworn Meter Inspector, and sealed when desired.

By Her Majesty's Royal Letters Patent.

PATENT BITUMINIZED PIPES,

For the Conveyance of Water, Gas, and Drainage.

OFFICES: 14A CANNON STREET, LONDON, C.E.

FREDERICK W. BOND, SOLE AGENT, No. 58 LIBERTY STREET, NEAR BROADWAY, NEW YORK.

This important invention, patented by Mr. Charles Newbold, and now for the first time introduced to the notice of the British and American public, may confidently be stated to be one of the greatest interest and commercial value, as the Patent Bituminized Pipes possess all the qualities necessary for the conveyance of Water, Gas, Sewage, Mine-Pumps, &c., viz.: great strength, great durability, and inoxidability, with the immense advantage of being about *one fifth* the weight of iron pipes, and about 35 per cent. cheaper; whilst, compared with lead pipes, the Bituminized Pipes are only about *one fourth* their price, without the possibility of the formation of the oxide and carbonate of lead, so dangerous for every purpose. They will stand 150 degrees of Heat, and after many trials it has been satisfactorily proved that rats or vermin will not touch them. They also withstand the action of all acids and salts.

Iron pipes are at present frequently covered with a coating of bitumen or coal tar before they are laid down; but the adherence of this coating to the metal being very imperfect, on account of vibration and the difference of expansion, this preservation is insufficient, besides being exposed to a number of influences which neutralize its efficacy—galvanic currents materially assist the formation of oxides and deposits, which cause the obstruction and eventually the destruction of metallic pipes.

The Patent Bituminized Pipes are neutral, non-conductors of electricity, and consequently are not exposed to any of the deteriorating influences mentioned above. The process of manufacture of these Pipes consist in causing a roll of paper to pass through a reservoir of melted bitumen, after which it is tightly coiled around a mandril to any required thickness; and thus, when hardened, a tube is formed of perfect texture, great hardness, and enormous strength. These Pipes are proved, by hydraulic pressure, to resist a pressure of 220 lbs. to the square inch, equal to 506 feet head of water, which is more than double the altitude of the highest reservoir in London. The bituminous composition which unites and covers these Pipes is so well known as an excellent preservative, that it will be unnecessary to demonstrate that, when laid underground, the durability of the Patent Bituminized Pipes may be considered as unlimited. The Pipes are made in lengths of seven feet, and are connected by socket joints of the same material as the Pipes; or they can be fitted with iron flanged sockets, screwed together in a most simple and inexpensive manner.

For Gas these Pipes are invaluable; the Gas-lining which we insert effectualy resists the action of Gas, and being non-conductors, there can be no condensation in them, and the joints made with the Patent Cement are so strong as to entirely prevent Leakage.

The cost of laying the Pipe is also small, compared with those of iron, and can be done by mere laborers. Although only now introduced into England, the Bituminized Pipes have been in use on the Continent during the last three years, and those which have been employed in Paris for the conveyance of gas have been ascertained to be as perfect now as when first laid down.

DIRECTIONS FOR JOINING THE PATENT BITUMINIZED PIPES.

Pack the pipes level in the ordinary way; slip the collar over one of the pipes; draw the ends close together and warm them by putting a hot iron between them; then press them together so as to make them adhere; take a piece of iron wire netting, about half an inch in the mesh, a little narrower than the length of the collar, and long enough to wrap once round the pipe, spread the collar over it and the joining; close the ends with clay; pour the melted cement into the manhole of the collar, and fill up the interior space; then remove the clay and the joint is finished.

It is necessary to leave a small vent hole in the clay at each end of the collar to allow the air to escape as the cement is poured in, that there may be no flaws or air bubles in it when cold. If in cooling the cement settles in the manhole, fill up again.

N. B.—The cement should be broken into small pieces and melted in a pot as you do lead, at a low temperature, until it is dissolved; it must be stirred while melting; then take it off and keep stiring it as it cools until it becomes nearly as liquid as water; then pour quickly.

All Orders should be addressed to the

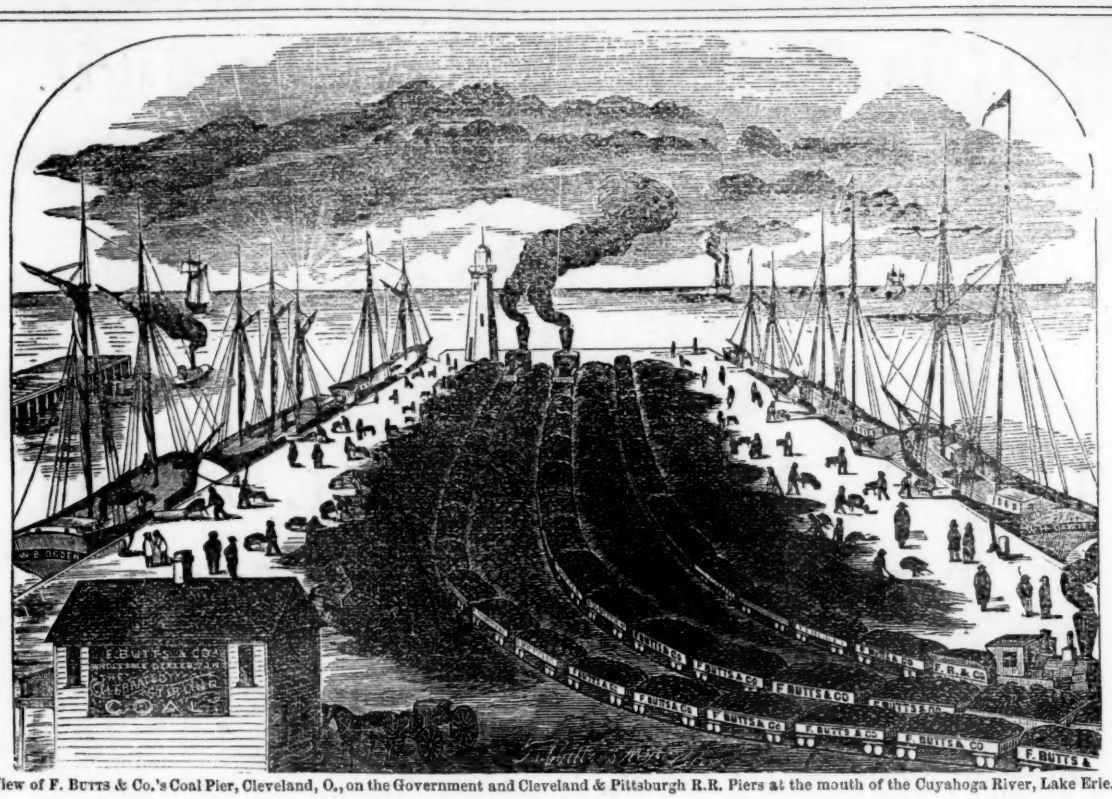
Patent Bituminized Water, Gas, and Drainage Pipe Company, Limited,
14A Cannon Street, London, C.E.,
ALEXANDER YOUNG,
Managing Director;

or to FREDERICK W. BOND,
Sole Agent, 58 Liberty Street,
(Between Broadway and Nassau Streets,)
NEW YORK.

SCALE OF PRICES, delivered on board ship, at LONDON.

Inside Diameter.....	2-in.	3-in.	4-in.	5-in.	6-in.	7-in.	8-in.	9-in.	10-in.	12-in.	16-in.	20-in.	24-in.	30-in.	36-in.
Price per Foot, including Collars..	s. d. 0 4	s. d. 0 6	s. d. 0 8	s. d. 0 11	s. d. 1 2	s. d. 1 5	s. d. 1 8	s. d. 2 0	s. d. 2 4	s. d. 2 8	s. d. 4 2	s. d. 6 0	s. d. 8 6	s. d. 11 0	s. d. 13 0

Cement for Joining, For Sale as above.



(View of F. Butts & Co.'s Coal Pier, Cleveland, O., on the Government and Cleveland & Pittsburgh R.R. Piers at the mouth of the Cuyahoga River, Lake Erie.)

F. BUTTS & CO.,

(Successors to BUTTS & KENDALL,)

DEALERS IN THE CELEBRATED

STERLING COAL!

PITTSBURGH, AND OTHER GAS COALS,

CLEVELAND, OHIO.

Dear Sir:—We beg leave to call your attention to the following, from which, and others, (and the universal expression of Gas men, as to the superior quality of Sterling Coal,) we believe that it is the best Gas Coal in the country.

From the MANHATTAN GAS LIGHT CO., New York.

Gentlemen:—Yours of the 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactorily—averaging 9,520 cubic feet of 15 candle Gas per ton of 2,240 lbs., and 41 bushels of Coke weighing 1,465 lbs.

We consider it among the best of American Gas Coals, for the quantity and quality of the Gas produced, and also for the excellent quality of its Coke.

I am Gentlemen, Your Obedient Servant, CHARLES ROOME, President.

From the OGDENSBURGH GAS CO., Ogdensburgh, N. Y.

January 6, 1862.

Messrs. F. Butts & Co.—This Company has used your Sterling Coal since July, 1860. We consider it the best Coal we have ever used; gives us larger yields of Gas, requires less lime, and makes a superior Coke. Respectfully, Yours, R. E. GORDON, Sup't Og. Gas Works.

From the RONDOUT AND KINGSTON GAS LIGHT CO., Rondout, N. Y.

January 10, 1860.

Messrs. F. Butts & Co.—Gentlemen:—This Company have used your Coal nearly two years. It is in every respect satisfactory, and to it is given the preference over all other coals. Its average yield is 4 40.100. The light clear and strong. The Gas is easily purified and quite free from sulphur. The yield of Coke is large and of superior quality. It is, in my opinion, equal to any Gas Coal in the market. Very Respectfully, WM. W. HAGUE, Sup't.

From the SANDUSKY GAS CO., Sandusky, O.

January 6, 1862.

Messrs. F. Butts & Co., Cleveland.—Gentlemen:—We have used your Sterling Coal for two years and six months past, and find it superior in quality and all that a number one Gas Coal can be. The illuminating power of the Gas is high, the Coke is of a superior quality, and in many instances our monthly average product has been 4 40.100 per one lb. Coal. It gives us entire satisfaction. I am, Gentlemen, Yours, Respectfully, WILLIAM HUDSON, Sup't and Sec'y.

From the TOLEDO GAS LIGHT CO., Toledo, O.

Gents:—Your favor of the 28th inst. to hand and noted.

The Sterling Coal received from Messrs. Butts & Co., the last summer and fall, fully sustains the character it has as a Gas Coal, from previous use in our works. We think the quality of Gas is very good, a little better than that produced from the Coal had of them the year previous—yielding 8,666 feet per ton of 2,000 lbs., and 36 bushels of Coke of very good quality, well adapted to our use.

Respectfully, Yours, GEO. SPENCER, President.

From the BUFFALO GAS LIGHT CO., Buffalo, N. Y.

Messrs. F. Butts & Co.—The Sterling Coal we have had from you we find to be an excellent Gas Coal. The yield of both Gas and Coke is good. The illuminating power of the Gas is high and the quality of the Coke is very good. ROBERT ROBSON, Foreman Gas Works.

From the CLEVELAND GAS LIGHT & COKE CO., Cleveland, O.

Gentlemen:—This Company has used between 3,000 and 4,000 tons of your "Sterling Coal," and are still using it with very satisfactory results. We find the average product of a ton of 2,000 lbs. is about 8,800 feet of Gas, and about 37 bushels of Coke. The Gas is of good illuminating power and quite free from sulphur or other impurities, one bushel of lime purifying 9,000 feet, and the Coke of vesy superior quality.

The yield of Gas is about the same as from the Pittsburgh Coal, and the Coke is better adapted to our use. Yours, Truly.

T. DWIGHT EELLS, Secretary.

From the ALBANY GAS LIGHT CO. Albany, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—We have been using your "Sterling Coal" at these works for two years, finding it all that is important in Gas-making Coal, as respect yield and quality of Gas, and freedom from sulphur—as much so as any of the Coaking Coal in use. We are disposed to contract for a further supply of the same quality.

Very Respectfully, PAUL A. SABBATON, Sup't.

From the TROY GAS LIGHT CO., Troy, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—The Coal we have used for the past year at our works has been mostly "Sterling." It has given us full satisfaction in every respect.

S. S. DAUCHY, Sup't.

The following analysis of "Sterling Coal" was made by Prof. J. Lang Cassels, Professor in the Cleveland Medical College, who stands at the head of his profession as a chemist, and any statement made by him can be relied upon with safety.

Sp. gr	1,288
Eygremaeric Moisture	1.85
Volative Combustible Matters	34.15
Coke (clear and porous)	64.00
	100
Fixed Carbon in the Coke	62.00
Ashes (yellowish white)	2.00
	64.00

COMPOSITION OF ASHES.

Silex	0.80
Alumini	0.45
Sulphate of Iron	0.75
	2.00
Per centage of Sulphur	0.23

J. LANG CASSELS, M. D.,
Prof. of Chemistry, Clev. Med. Col.

P. S.—The specimen from which the above analysis was made was taken by myself from a car load, and may be regarded as a fair average; in fact, this coal is very uniform in its characteristics. It also yielded 4 per cent. more gas than the Pittsburgh Coal. J. L. C.

We would also refer to Gas Companies in the following places:

New York City (Manhattan and New York Co.'s), Brooklyn, Albany, Troy, West Troy, Rochester, Oswego, Ogdensburgh, Lansingburgh, Newburgh, Rome, Palmyra, Geneva, Yonkers, Rondout, Kingston, Albion, Brockport, Seneca Falls, Elmira and Lyons, in State of New York; Cleveland, Toledo, Sandusky, Norwalk, Oberlin, Salem and Fremont, in Ohio; Detroit, Ann Arbor, Grand Rapids, Kalamazoo, Jackson and Adrian, in Michigan; Coburg, in Canada; Chicago, Ill., and two Companies in Milwaukee, Wisconsin.

STERLING COAL MINES, situated in Pennsylvania, are wholly under our control; the coal mined and sold only by us or our agents. (Agents in every instance having authority over our signature.)

Five years experience in Mining, Sale and use of Sterling Coal, gives us full confidence in asserting there is no Coal that combines all the requisites so largely for a Gas or Smithing Coal as this.

This year we are several hundred yards further in the Mine than last season, and feel assured Sterling Coal will more than sustain the high reputation it has heretofore gained.

Our facilities largely increased for Mining and Shipping, we are prepared to supply the great demand for this Coal on a much more extensive scale.

Not being dependent upon high water for transportation, but receiving our Coal by RAIL, we are at all times prepared to fill orders, and ready to contract for delivery of the Celebrated Sterling Coal, on board Vessel or Cars at Cleveland, or at works of Gas Light Co's, in any of the Northern States or Canada.

Cleveland, *January* 15, 1862. Address— **F. BUTTS & CO., Drawer 74, Cleveland, O.**